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Keys to Farm Profits

Condensed from Iowa Farm Economist

Herbert B. Howell

WHAT ARE the key reasons that make the difference in profits in operating a farm? The answer will vary with operators and the type of farming followed. But a study of the records kept during 1944 by 203 operators of 160-acre farms will reveal some of the important factors. These records were kept in cooperation with the Agricultural Economics Department of Iowa State College.

As is true of much of Iowa's agriculture, these 203 farmers operated livestock farms. They raised an average of 153 pigs, milked an average of 9 cows, averaged about 32 other cattle and a laying flock of 190 hens. Their cropping program for 1944 averaged 60 acres of corn, 24 acres of small grain, and 41 acres of rotated hay and pasture.

Although these farms are above average for the state, the factors affecting profits are as important on these farms as on any average 160-acre livestock farm. Therefore let's take a little closer look at their records.

During 1944 these farm operators faced increased operating costs, narrower margins between the value of livestock produced and the cost of feed, and lower crop yields. Yet many of them were able to show high profits while others dropped to the lowest level revealed in the last several years. This was no accident but grew out of very definite reasons.

These 203 farmers showed an average management return (profit) for 1944 of $1,549. The high one-third of these farmers had an average management return of $3,640 while the low one-third went in the red $543, a difference of $4,183 between the two groups.

Since these are all livestock farms one of the first factors we will want to consider in our search for the reason behind this wide

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difference in profit is the margin on the feed fed. The high profit group obtained $1.53 livestock increase for each $1.00 of feed fed. The low group obtained only $1.14 of livestock increase for each $1.00 of feed fed.

We can better see the importance of the margins of livestock returns over feed cost by examining the following figures. The high profit one-third of these 160-acre farmers fed $6,732 worth of feed and produced $10,299 worth of livestock. The low profit one-third fed $5,924 worth of feed and produced only $6,953 worth of livestock.

Thus the high group had a $3,568 margin over feed costs of $6,732. The low group had only an $829 margin over feed costs of $5,924.

Several reasons contributed to this wide difference in feed returns. They include feeding methods, controlling disease, quality of livestock, as well as buying and selling and shifting of enterprises to meet changing conditions.

Further light is thrown on some of these factors by the following data: The high profit group weaned an average of 6.5 pigs per litter, the low group but 5.5 pigs per litter. The high group averaged $150 dairy income per cow, and the low group but $113. Income per hen was $0.38 more on the high group than the low group.

All these factors add up to what is known as livestock efficiency. Their importance is indicated by the difference between a profit and a loss in farm operations.

Crops also play an important part in determining the success of farming in Iowa. The high profit one-third of these 160-acre farms average 66 bushels of corn to the acre. Compare this with the 52 bushel per acre yield harvested by the low group!

This difference in corn yields plus other reasons, such as the type of rotation, accounted for a variation between the high and low profit groups of $11 per acre in the gross value of crops. The high profit group averaged $48 per acre and the low group, $37. This alone accounts for over $1,200 of the difference in profits between the high and low profit groups.

To carry out their farming program in 1944, the high profit group used one more month of labor and had a slightly higher power and equipment cost per acre than the low group. The high group of 160-acre farm operators used 18 months of labor including operator and family labor. The low group used 17 months. The spread in power and equipment cost was only slight, being $9.57 per acre for the high group and $9.55 for the low.

Adding up the facts we find

that the high profit group had a more efficient livestock program producing $10,299 worth of livestock from $6,732 worth of feed while the low group produced only $6,953 worth from $5,924 worth of feed. The high group also had $11 more income per acre from crops. Putting this together, it meant that the high group showed a gross profit per man of $7,162 as compared to $3,888 for the low group. These differences more than offset the slightly higher months of labor use and the higher power and equipment cost for the high profit group.

Farm profits are not by chance. They are made by planning the complete farm operations so as to make the best use of the resources of land, labor and capital available. The high income group of farms in this study used their feed efficiently. They planned their cropping program to give them the greatest possible returns. And at the same time they did it with only a very slight increase in costs.

These keys to farm profits are available to any farmer who will keep a good set of records and then do the planning necessary to put the keys into operation.

Knighted Cut

It is common knowledge that most of the highly specialized beef breeds of cattle, such as the Shorthorn, Hereford, and Aberdeen Angus, have been centuries in the making. In Great Britain where they were developed, King Charles II was so delighted with the quality of a particular beef loin that he knighted the cut—now the familiar "sirloin." Some historians credit the same act to Henry VIII and James I.

—*Marketing Activities*

More Attention to Breeding Efficiency

Guernsey Breeders' Journal

E. J. Perry

Extension Professor, Dairy Husbandry, New Jersey State College

THE annual economic loss that the dairy industry suffers because of poor breeding efficiency of our dairy cattle, is known to be enormous. Many leading veterinarians aver that all too little research work is being done to aid in solving some of the problems of sterility. This brief paper is in no sense an attempt to discuss breeding troubles, but simply the worth-whileness of paying attention to a few management practices that are sometimes overlooked. Let's give nature a chance to keep reproductive performance at a high level.

Recently certain breeders have been paying more attention to fertility as an inherited characteristic. As yet, however, a good many still doubt or do not know that regular, year after year prompt conception of cows and "sureness" in bulls can be a family trait the same as color markings, fat percentage and body type. The system of mating has been known to induce low fertility. An historical glance reveals that families of live stock and even certain breeds have disappeared due to sterility. Managers of breeding associations are noting the wide difference in rate of conception among bulls of the same age that are fed and managed alike. For example, it is not uncommon for the range in per cent of cows conceiving on first service to such bulls to be all the way from 40 to 75, with enough cows involved to afford a good measure of each one's fertilizing capacity. It is very possible that inheritance has been one of the important factors in such a result.

When foundation cattle are purchased, it is so easy to appraise them altogether on the records and type of themselves and their ancestry, and forget all about the fertility of the family from which they sprang. Losing sight of reproductive efficiency can be just as uneconomic as the buying of low record stock. The Oregon State College recently made a fertility study of its herd, covering a 25-year period. Considering each individual foundation cow and her female descendants as a cow family, family B had a mean reproductive effici-

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ency of 85 per cent whereas, in contrast, family C had 54 per cent. To be 100 per cent efficient a heifer was supposed to conceive at a certain age, depending on the breed, and drop a calf each year thereafter. Furthermore, the study showed a significant correlation between the reproductive efficiency of each foundation cow and her female descendants. One cow is reported as having lived 15 years, dropped 14 calves and transmitted good vigor and fertility to her descendants. After 20 years, 40 females and 37 males traced to her. Several other good producers left no descendants in the herd. A foundation cow in the New Jersey Experiment Station herd left 21 good female descendants in an 11-year period, whereas only two descendants remain to the credit of a good producing stable-mate after 12 years. These data indicate that inheritance is partly responsible for the marked differences in fertility among cow families. When buying a herd sire or other foundation stock it pays to get as many facts as possible concerning the reproductive history of the relatives.

Breeding Records

The keeping of accurate breeding records is a necessary step in orderly and constructive breeding, and hence is a big factor in building up profitable production. In the press of farm and herd work one cannot carry dates of last calvings, last heat periods, number of services, dates of coming calvings, etc., in his mind. The writer has heard many dairymen say that they were surprised at the results obtained when they made the keeping of breeding records a serious piece of business. Indeed, so important is this job that some of the artificial breeding associations require that the inseminators mark down the data on the furnished sheet in the barn at the time of each visit. One of the handiest and most satisfactory ways to handle this is to thumb tack the record sheet on a ply board about 12 by 14 inches and hang it up in a convenient place in the barn where it can be referred to readily. It should be kept in clean condition by means of a piece of canvas cloth or heavy paper, or by turning it face to wall after entering or noting data. Many breeders like a sheet that includes columns with these headings: "Name or number of cow," "date of last calving," "date bred," "bull used," "date due," "normal or abnormal calving," "sex of calf," "disposition of calf." Another column, "date of first heat," is favored by some and has the advantage that since most breeders do not breed on the first period, listing when it occurred prompts them when to begin watching for the subsequent periods. It is ad-

visable to have at least two columns each for "date rebred," and "bull used" to provide sufficient space for data about hard breeders.

The necessity for prompt and correct keeping of the record should be emphasized to any new herdsman or other employee entrusted with the breeding program. If it is discovered from the records that certain cows are coming in heat at 19 days, then at 32 days, then at 12, etc., it is then obvious that the services of a veterinarian are badly needed. The number of services required per conception affords a good idea of the general breeding health of the herd. Certain cows have a fairly quiet heat and detecting them is sometimes a difficult job, especially in the winter, in the northern part of the country where some herds are kept indoors all of the time, or the greater part of it. As an aid, some owners let a young yearling steer, able to manifest sexual desire, walk down the line behind the cows once each day. Others sometimes use a young bull but keep him under leash.

Conserve Sire

It is always better to under use a bull than to risk overusing him. What is a moderate amount of service for one bull is often heavy service for another of the same age and condition. There is no hard and fast rule on bull usage. Each animal is capable of a certain amount of optimum performance and it is up to the manager to determine what that is. Well-grown, vigorous yearlings can be used lightly, beginning at about 14 months of age, with one service or semen collection every 12 to 15 days. A virile two-year-old is usually able to stand two services every 10 days, with 60 to 85 services or collections yearly. If used naturally, this number of services should suffice for 35 cows, allowing for a few hard breeders. Bulls three to five years of age should be able to serve 50 females if the breeding season covers the entire year. Too often the season involves a short period; the bull is overused and impotence develops. A well-bred, fertile bull is invaluable, hence his breeding health should be prudently conserved. One should not mistake willingness to serve as a sign of a fertile bull. In fact, there is no significant correlation between sexual desire and volume of semen or concentration of viable semen. In a semen exhaustion test some Russian investigators found that energetic bulls with strong sexual impulse gave smaller amounts of semen than the less active bulls.

Training Young Bulls

It is important that young bulls become accustomed to sensible routine in handling. His first few services should be successfu

Avoid letting him serve a nervous cow or heifer. See to it that the ground is even and firm. A definite place should be reserved for service and every breeding pen or rack should be so constructed as to prevent accidents. There is such a thing as bull psychology, but comparatively little is known about it today. It is common knowledge that a few bulls not trained to a breeding rack or artificial vagina when young, will never take to them at maturity. All of this indicates that we must recognize our herd sires, young and old, as nervous creatures that must be trained from the early period and studied, and catered to understandingly.

Precautions When Buying Bull

When we buy a bull we buy the semen that he is able to produce. Therefore, he should be bought subject to his ability to get healthy females in calf. Furthermore, before paying a long price for a breeding bull, his breeding record where he was last used should be closely scrutinized. He should also be examined by a veterinarian to determine if his semen is of good quality and whether he has any genital disorders.

Every careful breeder guards against allowing his bull to pick up infection by serving diseased females. Too often a young bull is mated to hard breeding cows, thinking that he can accomplish wonders because of his age and virility. Better play safe by using him artificially, at least until the veterinarian has pronounced the herd in clean condition.

Time to Breed

The breeding efficiency of many herds could be improved if every cow and heifer were bred toward the end of the heat period instead of the early part. This is not always possible because of the difficulty of detecting the beginning of heat in the case of certain cows — for example, those whose periods start at night. The length of heat in the cow ranges from 6 to 30 hours, with the average approximately 18 hours. Ovulation, or the freeing of the egg from the ovary, occurs within 24 hours after the end of heat. When there is doubt as to time that heat started, some owners breed the cow twice, once when heat is first detected and again about 8 hours later. This increases the chance of pregnancy to some extent and is advisable in the case of hard breeders or cows whose previous heats escaped attention.

Exercise

There is difference of opinion and some conflicting evidence regarding the amount and kind of exercise needed to keep bulls in the best physical condition. Here again the requirements vary with

individual bulls. When some breeder tells about his most fertile bull being one that was stanchioned up or kept in a small box stall all his life, we can put it down that he was a sure breeder not because he got little or no exercise, but in spite of it. A sensible plan is simply to see to it that every herd sire has a roomy indoor pen and a large outside runway or lot, the bigger the better. If he can browse around on some good pasture, the better off he will be. Forcing bulls, especially the older ones, to take exercise by means of a power exerciser or otherwise, benefits them, according to reports received from managers of some of the large breeding associations. Furthermore, this practice helps to keep the bulls tractable. However, the use of an outdoor runway in addition to the exerciser is recommended.

Breeding Efficiency in Females

Maintaining breeding efficiency in cows is a harder job than maintaining it in bulls. There are more intangibles. As Ex-Governor Hoard of Wisconsin well said, "The inside of a cow is the darkest place in the world." Her reproductive tract contains a larger surface for infection than do the organs of the bull. The ovaries frequently become diseased and are more difficult to examine than the testicles. The use of the microscope is less advantageous. We can't gather up the ovum and examine it like we do the myriad of sperm from a bull. The convoluted Fallopians tubes and the horns of the uterus are favorable lodging places for infection with the resulting various forms of metritis. Again, in any infected spot such as the cervix, or very narrow opening into the uterus, sperm are apt to be "stopped cold" and hence no fertility occurs.

It pays (1) to select females from fertile families, (2) use clean bulls, (3) watch carefully for the heat period, (4) provide for assistance at calving time if necessary, (5) feed well-balanced ration because the cow must produce and reproduce, and (6) arrange for prompt examination and treatment of hard breeders by the veterinarian. A few years ago, a herd health survey covering several counties in New York revealed that the average number of times the veterinarian was called per year was two. The herds studied were sizeable, the kind that furnished the major part of the yearly income. Today, happily, more dairymen everywhere are recognizing that the rendering of intelligent assistance to nature, results in larger milk and fat production and greater satisfaction in the honorable and indispensable business of dairy farming.

Hungry Plants and Hungry People

Condensed from Certified Milk

Dr. Warren B. Mack

Head, Department of Horticulture, The Pennsylvania State College; President, American Society for Horticultural Science

HUNGRY plants and hungry people open many fields of study for the young scientist. Thus far, scientists have only begun to find the nature and extent of the hungers that exist. Much more knowledge is needed on these aspects of hunger, before an understanding can be attained of the ways in which the existing hungers may be satisfied.

Examples of studies on hungry plants and hungry people are two researches now in progress at The Pennsylvania State College. One of these, known as the Pennsylvania Mass Studies in Human Nutrition, has been in progress during 10 years, under the direction of Dr. Pauline Beery Mack, Director of the Ellen H. Richards Institute. In this study, a staff of medical and dental scientists, chemists, physicists, and physiologists has examined individuals and families selected to represent the populations of certain cities, towns, and rural areas in Pennsylvania in the same proportions as the various racial, age, economic, and social groups are found in the respective populations. Records are kept of the foods eaten by the persons examined and these are compared with the nutritional status or condition of these persons or families.

Measurements of nutritional status include medical and dental examinations, physical measurements to show body build, development, posture, and conformation, chemical analyses of body fluids to find their content of vitamins, minerals, and proteins, microscopic examination of the skin and tissues of the eyes, mouth, and tongue, X-rays of bones to reveal structure and mineral content, and measurement of certain abilities and functions known to be related to nutrition.

The studies include also observations on the improvement in various respects brought about by certain foods and supplements added to the diets of certain people on an experimental basis.

The other of the two studies on

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hungers mentioned earlier is an investigation on plant nutrition carried on by Dr. Walter Thomas, plant physiologist of the Laboratory of Plant Nutrition of the Department of Horticulture at The Pennsylvania State College, during more than 35 years. In this investigation, the mineral nutrition of crop plants grown by commercial methods has been analyzed by determining the concentrations and proportions of chemical nutrients in selected leaves, the plant organs in which occur many of the important syntheses necessary to plant growth. These concentrations and proportions are determined from time to time during growth, and are related to the development and yield of the plants as well as to different fertilizers, cultural practices, and climatic conditions to which the crops were subjected.

What are the signs of hunger, and how common are they? In people, marked over- or underweight, toneless muscles, fragile bones are commonly known signs; defective vision, defective teeth, headaches, rheumatic pains, listlessness, sleeplessness, indigestion, susceptibility to infection and especially many of the generally accepted maladies of advancing age now are known to be associated with hungers of one type or another. In plants, yields of crops which average not more than one-fourth of those which the climate and conditions other than nutrition are capable of producing; crops of poor market and edible quality, lacking in nutritional value.

Both of the research studies described have shown that plants as well as humans are suffering from many varieties of hunger. A report of part of the Mass Studies contains this noteworthy statement, "Of all the subjects studied (thus far), only two boys —brothers of junior high school age—were free from dental caries and were uniformly high in all tests given to them. . . . This is a report of the dietary habits and state of 2,511 urban and rural subjects, comprising two family and nine child groups, representing a broad range of incomes." In other words, fewer than one in one thousand were so good in nutritional condition that they could not have been made substantially better in one respect or another through improvements in diet. The diet of these two boys, let it be emphasized, was good by no mere chance. It was professionally planned and supervised from their birth on; even the diet of their mother likewise was planned and supervised before their birth.

The reason for this state of affairs is to be found in the dietary records of 600 children representing the same distribution of family income as that of

the entire group. Of these children, approximately 46 per cent received in their diets the quota of energy recommended for their respective sexes and ages by the Food and Nutrition Board of the National Research Council; 41 per cent received their full quota or more of protein; 27 per cent received their full quota or more of calcium; 30 per cent, their full quota or more of phosphorus; 46 per cent, their full quota or more of iron; 57 per cent, their full quota or more of Vitamin A; 40 per cent, their full quota or more of Vitamin B1; 45 per cent, their full quota or more of Vitamin B2; 4 per cent, their full quota or more of niacin; 46 per cent, their full quota or more of Vitamin C; and 4.5 per cent, their full quota or more of Vitamin D. When it is considered that those receiving their full quota of one dietary essential — energy, for example — might not at the same time be among those receiving their full quota of another essential, it is understood that malnutrition of one or another type or degree was found in all except the two boys already mentioned.

The plant studies by Dr. Thomas show lacks in their nutrition similar to those in humans. Yields of 100 bushels of corn or 27 tons of tomatoes, produced by good nutrition, compare favorably with yields as low as 20 bushels of corn or 8 tons of tomatoes yielded by plants with insufficient nitrogen, calcium, phosphorus, potassium, or magnesium, or with improper proportions of these major nutrients. To satisfy these hungers, not only must the foods or nutrients be adequate and of the right kind, but also must be in the proper proportions. Hungry plants result in hungry animals and hungry people, because they do not supply the quantities and qualities of nutrients needed to satisfy the hungers of the ultimate consumer. Vast areas of soils in this country either lack the nutrients or supply them in improper proportions to nourish fully the plants, animals, and people living on them.

A New Principle in Weed Control

Condensed from Farm Research

H. B. Tukey and C. L. Hamner

A NEW IDEA in weed control has appeared. It consists in the use of small quantities of so-called "growth-regulating substances" to induce growth responses in weeds which eventually result in their destruction. In some instances the weeds are excited to such activity as to literally grow themselves to death.

The new material is one of that group of chemicals used to prevent the premature dropping of fruits, promote the rooting of cuttings, and set tomatoes in the greenhouse. It is an organic compound, 2.4 dichlorophenoxyacetic acid, shortened for convenience to "2-4-D." It is relatively easily manufactured, not expensive, and already available. In many ways, it is as impressive a material for weed control as DDT has been for insect control.

To give some idea of the results which have been secured at the Experiment Station at Geneva, the following five tests are briefly described.

Experiment 1 — On July 14, 1944, 3½ acres of bindweed infesting a block of apple nursery stock were sprayed with 2-4-D at the rate of 1 to 1,000 from a knapsack sprayer, using just enough spray to wet the bindweed foliage lightly. The plants took on a dark green color at once, lay flat to the ground, became stiff, and were arrested in development. Flowers did not open. At the same time, the below-ground parts became enlarged and split. Within 10 days they were dead and disintegrating and the above-ground parts dried up and died. The bindweed was affected to a depth of 14 inches and suffered a most severe check. The apple rootstocks were apparently not affected.

Experiment 2 — The material was applied to other plants during July, August, and September, also with striking results. For example, sow thistle, narrow-leaved plantain, dandelion, lamb's quarters, round-leaved mallow, chickweed, pigweed, and ragweed were destroyed; purslane, Canada thistle, milkweed, and poison ivy were severely checked. But grasses were, in general, only slightly if at all affected. The effect on dandelion and narrow-leaved plantain was to produce lengthening and broadening of the base of the leaf until it be-

Reprinted by permission from Farm Research, Geneva, N. Y., July, 1945

came ribbon-like, twisted, and whitish. With lamb's quarters, pigweed, and round-leaved mallow, the main stems became bent and split. With sow thistle the below-ground parts proliferated enormously and literally grew themselves to death. With poison ivy the formation of chlorophyll was checked, the plants became chlorotic and weak, and were dead by spring.

Experiment 3 — Applications made to a Kentucky bluegrass lawn containing some white clover, infested with dandelion, narrow-leaved plantain, and round-leaved mallow. Within 10 days, the plantain, dandelion, and mallow were dead and disintegrating and the white clover was killed back to the main stolons, while the bluegrass was darker green in color and not injuriously affected.

Experiment 4—To test the residual effect of the material in the soil, treated areas were seeded to several cereals and turf materials five weeks after treatment. The seed germinated and grew, and the seedlings were apparently not affected.

Experiment 5 — Applications were made to several woody plants, as poison ivy, honeysuckle and choke cherry which harbors the X-disease of peaches. Midsummer applications to poison ivy at a concentration of 1 to 1,000 checked chlorophyll formation and resulted in chlorotic, weakened plants which were dead by spring. Spring applications to all three of these species at 1 to 500 resulted in browning and dying of the leaves and complete killing within one month.

Many Questions Yet Unanswered

There is much yet to be learned about 2-4-D. In many respects it is still in the experimental stage. How will the treatments vary from season to season? Will some affected plants recover? Is there danger to animals or to health? Will the soil be harmfully affected? How should the material be applied? When should applications be made for best results? What concentrations are most effective?

These and many other questions yet to be answered emphasize the fact that the material should be used with caution and in a trial way until exact recommendations can be given. Several commercial concerns are now placing materials of their own formulation on the market, which contain 2-4-D as the active ingredient.

Milky Disease Helps Suppress Japanese Beetles

Condensed from Pennsylvania Farmer

More of the so-called milky disease spore dust that kills Japanese beetles will be used in 1945 than ever before. A pest of oriental origin, the Jap beetle was first found in New Jersey in 1916. It has since spread into most of the states east of the Mississippi.

The Secretary of Agriculture holds a patent on the manufacture of the death-dealing dust, which was developed at the Moorestown, N. J., laboratory of the Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture. He has granted licenses for its production to a few commercial concerns.

This control measure is based on the results of research begun at Moorestown in 1935, which showed that the milky disease was largely responsible for a natural reduction of Japanese beetles in areas where they first appeared in the United States. The next step was to find a way to spread the disease more widely. When it was shown that the disease organisms do not thrive in artificial culture media, the entomologists devised a method for inoculating living grubs with them and using the bodies of grubs that died as a result of the inoculation to prepare a dust. Finally, they worked out a way to spread the spore-laden dust over the ground so that the beetle larvae would come in contact with it while feeding. A feeding grub takes up the disease germs, which reproduce at a prodigious rate until there are enough to kill the grub. Grubs infected with milky disease turn white and disintegrate, leaving many more disease spores to be picked up by the next grub that comes along—and so on.

A program for distributing the disease spore-dust mixture, started in 1939, continues in cooperation with other federal and state agencies. More than 65,000 sites of half an acre or more have been dusted at various points in 13 states and the District of Columbia. In addition, 128 government-owned reservations, comprising over 9,000 acres, have been treated. To do this work, the Moorestown laboratory has prepared approximately 100,000 pounds of standardized milky disease spore dust.

Reprinted by permission from the Pennsylvania Farmer, July 14, 1945, Pittsburgh, Pa.

Broiler Profits Almost Assured

Condensed from Kansas Farmer

WOULD you like to feel that the company buying your products is your partner in business? Such a partnership would seem natural since both farmer and industry are looking for profits. Let's take a look at an industry - farmer partnership in action.

Several years ago the Concordia Creamery Company, at Concordia, Kansas, had a problem. It wanted to develop a high-quality broiler project in the area to supply its packing plant. At the time there were not enough good broilers produced. So the company hired Henry Freeman as a poultry expert to work with farmers on the project.

Company officials decided that if farmers were to raise high-quality broilers they must first have high - quality, broiler - type chicks. A hatchery was set up for this purpose. White Plymouth Rocks were chosen as the best and most profitable broiler breed because of their excellent dressing qualities. They have good skin color, yellow shanks, and plumpness of body. They also grow rapidly, which makes them attractive to farmers.

Main stumbling block to using White Rocks was the large number of barebacks. Thru a breeding program based on selection Mr. Freeman developed an early-feathering strain. Kansas State College also has a new early-feathering strain based on a cross - breeding program. Both experiments have about eliminated barebacks.

Further work will be done by the company to develop a broad-breasted White Rock, as has been done with turkeys. Kansas State College is doing a lot of work toward improving egg - laying qualities of the breed. All of these things will benefit the farmer.

The Freeman experiment on early feathering has been so successful that from 90 to 95 per cent of all chicks hatched by the company show early feathering at one day old. The remaining 5 to 10 per cent feather earlier than the average chicks. This gives the grower a head start on his broiler program.

Here is the way Mr. Freeman worked out the early-feathering strain. He would visit farm flocks when chicks were 2 weeks old. Early-feathered birds would be picked out and toe-marked. When

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they were 3 months old they were taken from the flock and left on the farm as breeding stock. Culling was done again at the start of the hatching season. Then, pullets were culled a third time and bloodtested after starting production.

The real job for Mr. Freeman was selling farmers on raising broilers. Most producers didn't want to fool with them. It was easier and more profitable, they said, to keep a laying flock.

Company officials knew broiler production would pay farmers but realized they also had an obligation to take part of the risk. They solved the problem by working out a plan that put the producer into partnership with the company on his broiler project.

A flock owner who will take care of his flock and who is reliable can start a broiler project with the company. He gets all his chicks from the company hatchery. All his feed needs, based on the number of chicks taken, are figured by the company, which keeps him supplied with the proper amounts. Usually feed is delivered to the farm on a schedule without the flock owner having to order each time. A rigid outline for feeding and sanitation is provided for the flock owner.

Before chicks are turned over to the grower, his brooder houses and other equipment are checked by the company. Everything must be in order and all precautions taken against diseases before getting the chicks. "It doesn't pay either the farmer or the company," says Mr. Freeman, "if conditions are not favorable to success." Flock owners are dropped by the company if they fail at any time to follow sanitation or feeding outlines agreed upon.

All birds in the projects are given starter mash for 2 weeks, then grain and starter until 2 pounds of starter to the bird have been fed. If grain is plentiful, a concentrate is fed with grain. If grain is scarce, growing mash is most often used.

When chicks are about 6 weeks old, buttermilk with wet mash is hand-fed once or twice a day, depending on labor conditions on the farm. Grain and mash are fed free-choice at all times. If fed right, chicks will reach a 3-pound average at 12 to 14 weeks old, and will consume 3½ to 4 pounds of feed to each pound of live weight. This varies with seasons and conditions on the farm.

Broilers brought into the plant at marketing time are put in batteries. Then they are fed a final conditioning ration of buttermilk fattening mash for from 3 to 5 days.

Since the company provides all the feed on these projects, you might well conclude that the ob-

ject is to load the farmer up with expensive feed. As a matter of fact, the company urges maximum use of pasture and grain plus healthy chicks and sanitary conditions to insure use of a minimum of purchased food. Remember, they are partners with the producer, who must make a profit to stay in business.

Flock supervision is given by the company at all times. This includes culling, blood testing, and information on feeding and diseases. Company representatives are subject to call by the farmer for special problems at no cost.

The company culls the flocks at broiler age and will leave the best pullets on the farm for layers or breeders if the farmer wants them. Broilers are bought by the company, which guarantees to buy them at the time chicks are purchased by the producer. These broilers are graded and paid for on a grade basis. Your reporter saw only 5 No. 2 birds out of 1,600 being graded at the plant during his visit. All hatching eggs used by the company are purchased from co-operating producers.

If the grower is unable to finance enough brooder equipment to handle a profitable project, the company will lease equipment to him. But he must agree to buy the equipment at some future time. The chicks and their feed also are partially financed by the company. All settlements are made at the time broilers are marketed. Thus, producers do not risk all the capital and can carry larger projects.

Under this partnership program, farmers in 6 counties are taking part in broiler production. The plan is growing steadily as more flock owners see the success of their neighbors. Two broiler projects a year on each farm are recommended, followed by a turkey project. Turkey projects also are partially financed by the company, which urges farmers to use the same equipment as for broilers. Some farmers are producing up to 60,000 broilers a year, plus their turkeys. This puts their equipment to use almost the year around.

Is there danger of overproduction? Company officials say not. They claim there always is a market for good-quality broilers, even when chickens are plentiful. Their local market is within a 75-mile radius of the plant, but the bulk of the broilers go to the big eastern markets.

After raising from 2,500 to 12,000 broilers a year for 7 years in addition to wheat farming, Gus Liedtke, of Cloud county, has about decided to give up the wheat. "I was talked into this broiler deal against my better judgment," he stated. "But only 2 or 3 batches of those chickens

have failed to make money in the 7 years, and I never have lost any money on them. I usually market better than 90 per cent of my original chicks.

"This year I lost only 43 out of 2,500. Profits on my early projects averaged about 10 cents a bird, but now are running around 20 cents."

Most farmers feel that fewer than 1,000 chicks will not pay for the trouble of a broiler project. The company will not put out fewer than 500 to a farmer and recommends more. With broilers, it is quantity that counts, plus using your equipment as much as possible during the year. Depreciation on equipment is less when it is being used all the time and profits are more certain.

All broiler projects are handled under a written marketing agreement between farmer and company. This agreement sets out the obligations of both parties and makes them full partners, rather than just buyer and seller.

Because the company has a financial interest in every project, company men take a personal interest in the farmer and his success. Many farmers told of incidents in which personal service and interest by company representatives had saved them money or prevented heavy chick losses.

When times were tough a few years ago, the company cut its profits to give flock owners more, say these farmers. In other cases they have gone out of their way to make the projects profitable to the producers. The result is that there is a close bond between the company and its co-operators.

Here, at Concordia, industry and the farmer are going down the trail hand in hand to greater profits for all.

Earthworms, 150,000 to the Acre

Condensed from Farm Journal and Farmer's Wife

Williams Haynes

FISHERMEN each season dangle millions of earthworms in likely waters. No other bait enjoys such popularity with anglers. The fish may, or may not, hold similar views.

Christopher Gallup looks at the earthworm as bait for bigger crops. More earthworms, he contends, mean higher fertility.

In evidence he offers a yield of 196 bushel baskets of ear corn, in contrast to the 80 bushels his earlier methods produced. His swarming earthworms leave more than eight tons of their casts per acre. (The cast is the deposit after the worm digests the vegetable and mineral material which it eats.)

Then Gallup points to the chemical analysis of these casts. Compared with other topsoil, they contain five times as much nitrogen, seven times as much phosphorus, eleven times as much potash, three times as much magnesium.

How does one persuade the earthworms to multiply? Feed them, says Gallup; feed them trash and organic matter. His method is to work everything possible into the top six inches of soil, where, in the lower four inches, the worms do most of their living.

Gallup's farm lies among stony hills of eastern Connecticut. Two hundred and seventy years ago when King Philip and his Narragansett braves, in 1675, took to the war-path and ravaged that corner of Connecticut, a forebear of Christopher Gallup already had some of the farm cleared.

Fifteen years ago, determined to be successful as a farmer, as he had previously been in a Hartford insurance company, Gallup began operating the family's ancient homestead.

He says, "I went into our little fields with a heavy plow hooked to a 20 H.P. caterpillar tractor, determined to give that old land the works. I plowed deep. I put on lime and commercial fertilizer. I did everything the experts advised. I firmly believed with all its stones our New England soil was good soil. But the best I could get was 80 bushels of corn, in spite of a lot of fertilizer and hard work." Ultimately, Gallup hit on his answer — the springtooth harrow plus earthworms.

No one, Gallup says, knows all

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about earthworms. They eat and digest both decaying vegetation and soil itself. Their tunnels carry air and water into the ground. Exactly what happens in the gizzards between their suction mouths and the fertile casts is yet to be found out.

A scientist's count indicates that in Gallup's best fields as many as 150,000 worms inhabit each acre. A western student believes the worm population on an acre could be increased to ten times that number, enough to bring two and a half tons of digested material to the surface each 24 hours.

Gallup figures that four years are needed to build up the worm numbers. Harrowing the trash in helps in the first year to create their food supply. The second year the breeding stock begins to congregate, the third it multiplies. By the fourth the worms are heaving up subsoil in quantity.

"Nowadays," he explains, "we get out with the tooth-harrow as soon as the frost is out. That is a good three weeks earlier than we could use a plow, and a couple of weeks before the land could be worked with a disc harrow. Grass and perennial weeds can then be killed with surprising ease."

Gallup's cultivating method is to set the teeth of the harrow at the most shallow notch, and to go over the field several times. Then he spreads his manure and promptly harrows it in. After each spring rain he harrows again, both ways, each time lowering the teeth one notch.

Frequently people ask, "What about the trash? Doesn't it bunch up?" "And," they add, "aren't your fields 'dirty,' and isn't that litter an A-1 incubator for pests?"

Gallup says "No" to both questions. He is, in fact, strongly of the view that "earthworm tillage" keeps down the corn borers.

Early in the spring before a bit of new growth starts, the trash—even heavy trash like corn stubble — is quite tender after having been softened by frost and snow. Warm sun and spring rains, and the worms, hurry its decay. Even at the first harrowing, Gallup says the trash almost never bunches, and by planting time it has disappeared.

When he brings a piece of sod into cultivation, Gallup cuts the sod with a disc harrow late in July, and rakes crossways with the spring-tooth. Next he manures heavily and rakes in lightly with the spring-tooth. After five cultivations, he sows rye, and is ready by spring for his regular procedure.

You notice at once that he cultivates both in preparation and in regular tillage more often than usual. However, the tractor in high speed can harrow five or six times as fast as plow or cultivator can travel.

While the soil is still loose the corn is drilled in rows with a planter and cultivator with hiller-discs that throw a heavy ridge over the drilled seed. This, he believes, gives extra moisture for germination. Four to eight days later the cultivator with weeder teeth in front breaks down the ridge, destroying any young weeds. When the corn is a foot high the hiller-disc again throws back the ridge. Tractor cultivation continues until the corn is two feet high.

Gallup does not use hybrid seed. This spring he will plant selected seed from his 1944 crop, which will be detasseled for growing seed. He will also plant selected corn from his 1943 crop for the pollen rows in his seed plot. He thinks this avoids the disadvantages of inbreeding and gives vigor.

"Part of our increased yields," says Gallup, "is due to this kind of seed selection. But the method of cultivation which brings on more earthworms is mainly responsible." Maybe he has something.

One-Cow Silo

An inexpensive silo, for one cow or three or four, has been designed by Roy Hayman, agricultural engineer with an electric company in Oklahoma City. Anyone handy with tools can build one. It may be just the thing for suburban farmers, or for any family with a family cow or two.

It all began when Hayman decided to build a silo for his one-cow "dairy herd." He made a box, three feet wide, eight feet long and eight feet high, and divided it into seven vertical compartments, 1′x3′x8′. This way he can fill into one end of the box while feeding out of the other. He bought a small second-hand ensilage cutter, and rigged it up with an electric motor for about $50. This he can handle himself.

Hayman lines the walls with ordinary building paper, and has had no trouble with spoilage. Doors look somewhat like a wagon end-gate, and are held in place by cleats.

Hayman is enthusiastic about his "siloette" as he calls it. After finishing his own, he built a four-cow unit for a nearby farmer. Total cost of materials for the 4′x16′x12′ box was $90.

A local manufacturing firm is figuring now on several designs made of metal.

—*Farm Journal*

Blue Lupine Makes Good

Condensed from Southern Agriculturist

Harold Severson

DRIVE through the peanut country of the deep South in February or March and you'll find field after field ablaze with the blooms of that remarkable new legume called blue lupine. In less than a decade it has soared to almost unbelievable heights of popularity. It's spreading a protective carpet of living green across thousands of acres of ripped-up fields in a three-state area. It's reducing erosion, stepping up corn and peanut yields, and furnishing green manure by the millions of tons. In addition, it's becoming a lucrative cash crop due to its seeding habits.

No wonder this sensational newcomer is spreading like wildfire across Florida, Alabama and Georgia! No wonder seed production has rocketed from a two-pound packet back in 1935 to more than 8½ million pounds last fall! Small wonder indeed that vetch and Austrian winter peas are being abandoned on many farms in favor of this former outcast from Southern experiment stations!

What is blue lupine? Ten years ago, it was an immigrant from Europe that had not yet been able to win a place in the legume program of this country. It didn't like cold weather, so it failed at one experiment station after another. The majority of agronomists dismissed it from their minds as a complete disappointment.

Not all of them, however. J. D. Warner, head of the North Florida Experiment Station at Quincy, received a two-pound supply from Roland McKee of the U. S. Department of Agriculture and proceeded to experiment with this lupine. He knew something about its history. After all, lupines had a long and honorable career extending over many generations in Germany. It should thrive somewhere in the South.

To Warner's delight, blue lupine found the soil and climatic conditions at Quincy entirely to its liking. He watched it carefully, noting its vigorous early-season growth and its production of heavy yields of seed. Those two factors alone sold him completely on its possibilities as a cover crop for the lower South. After all, he reasoned, even though it were damaged by cold weather in January or February, blue lupine

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usually had made sufficient growth for a green manure crop by that time.

Warner proceeded to tell his friends in the Soil Conservation Service about blue lupine's special qualities. R. Y. Bailey, regional agronomist at Spartansburg, S. C., was one of the interested parties. In 1938, small quantities of seed were released for trial plantings on farms. The Soil Conservation Service bought a few hundred pounds and planted it in the demonstration area at Greenville, Alabama. Again in the fall of 1939, Warner let the Soil Conservation Service have a few hundred pounds for trial plantings at the land utilization project at Munson, Florida, and in CCC camp work areas in southern Georgia, Alabama and Mississippi.

Lupine failed to make the grade in south Mississippi because of an unusually severe winter in 1939-40, but it came through in splendid style elsewhere. Warner also supplied seed to farmers, county agents, vocational agriculture teachers, and others. Blue lupine continued to gain in popularity. More and more plantings were made and seed was saved in great quantities. In 1943 more than four million pounds of seed were harvested. The next year saw twice that amount. This year should see around 15 million pounds harvested. Much of that amount will be sold by seed growers to farmers all over the blue lupine area.

Today there's a backwash of benefit to every farmer planting blue lupine. He's affected in a vital place—his pocketbook.

Early in March, Dr. Tom Buie, regional conservator of the Soil Conservation Service in Spartansburg, invited me to make a tour of the blue lupine country. Known as the "blue lupine (loop'in) loop," the tour took us to Early County, Georgia, down to Quincy, Florida, and westward to Dothan, Alabama. We saw mile after mile of blue lupine rippling under a warm spring wind. We talked to a score or more farmers. We heard first-hand reports testifying that this new legume is both directly and indirectly putting money into the pockets of farmers. It was evident blue lupine has caught on just as sensationally with these farmers as lespedeza did several years ago in the upper South.

Growers long have needed a legume that would provide maximum growth for early turning under, even when livestock are in the fields. Hogs usually are turned into the fields after peanuts are harvested to glean the peanuts and it takes a strong, deeply-rooted plant to take the punishment these porkers can deal out. Blue lupine, however, has met that test in splendid fash-

ion, provided the stand is well established before the hogs are turned in.

One of our stops was on the R. R. McLendon farm near Blakely, Georgia. It was early in March and a tractor-drawn disc plow was turning under a fair stand of blue lupine. We asked Mr. McLendon the effect of previous green manure crops on his peanut and corn yields.

He stood looking at the nodding tops of the legume, turning over the question in his mind. In two or three weeks he would plant peanuts in that field. This was the fourth year he had planted blue lupine so he had ample opportunity to evaluate. Finally he spoke:

"The increase was very noticeable," he said reflectively. "I'm safe in saying that as a result of blue lupine, my runner yields have increased at least 400 pounds to the acre."

Then there's the testimony of J. Lee Smith, Florida extension agronomist. He has stated that ten tons of green lupine, when plowed under is capable of doubling or tripling the production of corn and that its nitrogen content is equal to that of 500 pounds or more of nitrate of soda.

A good stand of early-planted lupine should average five to ten tons of green material to the acre by the end of February.

But lupine does more than provide green manure. Its habit of producing a bumper crop of seed has caused nearly all farmers down there to have lupine seed patches. Yields have averaged from a thousand to 1,500 pounds of seed to the acre. It sells for at least 6½ cents a pound. Last year, farmers in Early County, Georgia, which modestly claims to be the "lupine center of the world," planted about 5,000 acres of seed. More than 1,000 acres will be saved for seed, and Chester Clardy, work unit conservationist in Early County of the Flint River Soil Conservation District, figures this acreage will produce over a million pounds of seed. Multiply that figure by 6½ cents a pound and that's what the crop should bring growers.

One farmer near Dothan, Alabama, sold seed worth $3,250 from a 29-acre field. Earlier that year he had sold more than 12 tons of peanuts at $160 a ton from the same acreage.

Much of the seed is harvested with combines. Farmers with small seed patches pull the mature plants and save the seed by flailing the plants over a wagon box. The seeds shatter and fall through woven wire into the wagon bed. Extreme care is necessary to keep the seed from losing its viability through improper drying and storage methods.

Lupine has been successfully grown by sowing the inoculated

seed over the peanut field just before the peanuts are dug. The harvesting operation covers the seed. The best planting dates are from September 15 to October 15. When planted by the middle of October, lupine usually makes sufficient growth to turn under so a peanut crop can be planted by the middle of March.

According to Mr. Bailey, blue lupine has grown well on most of the upland soils found in northern Florida and southern Alabama and Georgia. It also has grown well on the light sandy soils in the citrus-producing section of Florida, where there was sufficient soil moisture. Farmers north of Highway 80 in Georgia and Alabama may have little or no success with lupine because of its tendency to winter kill.

The strain of blue lupine being grown so extensively is not very palatable to livestock but cattle have been known to graze it without ill results. New and edible strains are being tested at the Quincy station by Mr. Warner. He is especially interested in the seed of these strains, because a strong market for edible seed would be quickly created.

"Palatable lupine seed would be a boon to hog producers because the seed matures in Florida at a time when no other fattening crops are available," he stated.

The lupine tour ended near Newtown, Alabama. Standing in the field with J. F. Heims, a farmer of that neighborhood, we heard him comment:

"I want to harvest enough blue lupine seed this spring to plant all of my 200 cultivated acres."

Then Mr. Bailey made probably the most significant statement of the trip when he said:

"And don't forget another important fact, fellows. When farmers plant blue lupine, there isn't a single cent going out of this section for legume seed. Instead of buying Oregon grown vetch or Austrian winter pea seed, they either save their own seed or buy it from neighbors. Every cent spent for blue lupine seed is staying in the South."

That's an important point to the majority of Southern farmers.

An Extra Ton of Milk Per Cow Each Year

Condensed from American Agriculturist

C. L. Dickinson

I LOOKED my heifers over yesterday and came to the conclusion that they came through the winter in pretty good shape. Now, I'm beginning to wonder how they'll look next October, at the end of the pasture season. Will they keep right on growing or will they coast along during the pasture season and just barely maintain their present size?

The importance of keeping these heifers growing every day so that they will mature into big cows is brought out by a New York State College of Agriculture study of the 1939 Dairy Herd Improvement Association Records.

In this summary, the four major breeds of cows were each put into four groups of small, medium, standard and large cows. Pure-breds and grades were combined.

The Holsteins averaged 904 pounds for the small group, 1100 pounds for the medium group, 1275 pounds for the standards and 1465 pounds for the large cows. For each 100 pound increase in size of these cows, there was an increase of about 800 pounds of milk in the yearly records. The group of 904 pound cows produced an average of 7,350 pounds of milk containing 270 pounds of fat. The 1465 pound cows produced an average of 11,700 pounds of milk containing 401 pounds of fat. There was a consistent increase in each group at the rate of 774 pounds of milk and 23 pounds of fat for each 100 pounds of increase in size. Assuming that my heifers will produce for at least six years, I can reasonably expect to get 4,400 pounds of milk and 138 pounds of fat extra from each of the heifers for every hundred pounds I can add to their size while I'm growing them. The difference between growing them into 1,000 pound mature cows and 1,400 pound mature cows means a difference of better than 17,000 pounds of milk during a six year productive life. At $2.50 per hundred pounds of milk (I hope prices don't go that low) each 1,400 pound cow will bring in $425 more than she would if she weighed only 1,000.

I've been talking about Holsteins, but the records on the other breeds show about the same

Reprinted by permission from the American Agriculturist, June 2, 1945, Ithaca, N. Y.

thing when the milk of the higher testing breeds is converted to a 3.5% butterfat basis.

I'm sure that most of us do a fair job with the heifers during the barn feeding months. It's only when the heifers are on pasture that we neglect them. If the heifers must look after themselves for the next 150 days, the chances are good that they will not grow nearly as much as they will if we step in and help them over the rough spots in mid-summer when the pastures are dried up. They should gain at least a pound and a half a day. This takes more feed than permanent pasture can provide. It means planning now to provide some extra feed for the heifers as well as the milk cows for mid-summer and fall grazing.

Plan on about an extra acre of sudan grass for each 5 or 6 heifers. Give the heifers some hay even now, while the grass is good. Turn them into the early-cut meadows in July and August. Watch them grow and keep them growing. They'll pay you well later for the extra care you give them now.

Bred Heifers, Better Beef?

Are the lower market prices paid for bred yearling heifers justified?

Not if they are marketed by the end of the fifth month of pregnancy, so the University of Illinois livestock specialists say. Their slaughter tests and carcass studies show that *neither the dressing percentage nor the market grade of the beef was lowered* at this stage.

The bred heifers had quieter dispositions, were less active and had better appetites than the unbred ones.

In the Illinois tests the bred heifers put on a higher finish, the carcasses containing 20% more fat than open heifers. 5% less lean and 10% less bone. Also it appeared that the bred animals put on a good market finish sooner.

—*Farm Journal*

Land Gets Grass Cure

Condensed from Missouri Ruralist

It is amazing what a treatment of grass crops will do for sick land that is ailing from erosion and misuse. This prescription is doing wonders for large tracts of Calaway county land in Missouri in the Cedar Creek Forest and Pasture Area, a project of the Soil Conservation Service.

Here 13,000 acres have been purchased by the Government—half of which were in abandoned farms. Fields stripped of topsoil, hillsides cut with ravines, weeds the chief crop—this land really was sick. A combination of farms too small to support families, and falling prices with which to pay off inflated mortgages, had brought about the decline of a once prosperous area.

But now this land, bought in 1939, once more has a bountiful covering of green grasses. Cattle graze knee-deep in succulent pasture. Healed are the wounds of erosion. The soil is again productive.

Crops such as timothy, redtop, sweet clover, lespedeza and the small grains, plus helpings of commercial fertilizer, have wrought the change.

Once a visitor writing a history of the "Kingdom of Callaway" described it as a "stock breeders paradise with matchless and magnificent grasses on imperishable soil." The early day historian could not foresee the tragedy of land abused. He could not foresee the mad rush to grow inflated crops to feed the world in the first world-wide conflict. Grasses were forgotten. Crops that robbed the soil of its fertility brought higher prices.

Then as prices dropped and the fertility had been used, the small farms of the area no longer could support the families struggling to make a living on them. Only 214 farms in one area studied were as large as 160 acres—the unit considered large enough to be a "family farm." There were 852 farms in the same area too small —190 of them were less than 40 acres, and 291 were less than 80 acres.

And so the stage was set for "Three-P" land—that is land best suited for persimmons, pawpaws, and possums.

This area with its abandoned homes and runaway fields was suffering from an acute attack of land misuse. The treatment here was drastic—a slower cure can be recommended for other sections.

Reprinted from the Missouri Ruralist, July 14, 1945

The work of the Soil Conservation Service in its management of Cedar Creek is a practical demonstration of how our poorer soils can be saved. The change from sprouts to sweet clover has cost money but it has brought back to usefulness a land once abandoned.

Luckily, the process of restoring the land can still be seen at Cedar Creek—step by step as it has been carried out. With Cleo Statton, who is in charge of the project, as a guide the transformation from underbrush to pasture can be studied in detail.

The idea of the Cedar Creek project was to buy up blocks of the small farms that were in the saddest state and operate these larger tracts either as forest or pasture land. The government-owned land lies in numerous blocks and is not all in one area.

As the pasture land is developed, controlled grazing is offered to landowners surrounding the pasture area. The improved grassland serves as a common pasture for surrounding livestock owners. This allows operators of smaller farms to increase the number of livestock they can handle. The way it has worked out the farmers can devote more of their land to hay crops for winter feed and depend more for summer grazing on the government land.

Aid is given farmers of the community in planning their livestock program so that there has been a marked increase in livestock numbers in the area.

Preference in the grazing rights is given to the operators who need it most. To receive these rights the operator on his own farm must not plow up land considered too steep for cultivation, and must carry out all operations on the contour.

On the 13,000 acres acquired in the project, at the time of purchase there were 104 head of horses, 214 cattle, and 220 sheep carried on the 127 farms.

Last year on about 4,000 acres of grazing land, 1,358 cows and about 450 calves, plus 51 horses and 20 sheep, were grazed by 110 farmers. Most of this pasture area was unimproved and had not benefited from the treatments being used by the Soil Conservation Service in the back-to-grass plan.

Value of the pasture varied greatly. Some of it would carry 4 cattle to the acre; some of it required 6 acres for 1 cow. About 60 of the farmers using the pasture made estimates of gains and the grass produced about 315,000 pounds of beef. Certainly this was a fine contribution to the war effort to be made with abandoned land of a few years ago.

Just what magic has been worked to convert the hillsides of

clay and gullies to level pastures? And it does seem that nothing short of magic would do the job.

The plan as outlined by Mr. Statton appears to be simplicity itself. Old, familiar crops are used in the conversion, plus a limited amount of mechanical work. There are no complete terracing systems—only a few simple diversion ditches to divert the water from the heads of the old gullies.

First step in remodeling a worn-out field is to push in the gullies and grade down the banks. Road graders or bull dozers can be used for this work.

Next the entire field is plowed on the contour. That sounds simple but it's the biggest job of all. Sometimes the land is cleared but the smaller sprouts and persimmon trees can be turned under with big plows. The S. C. S. uses a heavy-duty version of the one-way disk plow and has found it the best yet.

The plowing job may not look so good but the chief thing is to work the ground.

Next thing on the program comes liming—a heavy dose on the lime-starved hills.

Then in the fall comes a seeding of rye, and lespedeza goes into the rye. The rye also gets a good helping of phosphate.

Later when the lime has had time to neutralize the acid soil, sweet clover is broadcast. This sweet clover is allowed to grow up and make seed the second year, then when it has made seed it is plowed under and the mixture of permanent grasses is sown. From then on the permanent grasses have sweet clover in them as well as lespedeza.

A mixture of timothy and redtop appears to be making the best showing as a permanent pasture in the Callaway area. From 8 to 10 pounds of the mixture of seed is sown, with rates of seeding for sweet clover being 12 pounds and for lespedeza 15 pounds.

Another grass crop looking good is orchard grass. Some brome grass also is being tried.

Usually the graded-in area around severe gullies gets an extra application of fertilizer. It is amazing how the use of the permanent grasses alone in gullies is checking erosion.

It is being shown that leaving a field to lespedeza alone will not check erosion. A common practice in Missouri is to seed down unfertile fields to lespedeza and just about forget them and expect lespedeza to hold the soil. It won't do it alone. Much of the heaviest soil losses come in the spring before lespedeza gets started. Lespedeza strands also are damaged by weeds when there is no grain crop sown with them.

How much does the reconversion of such land cost? Figures

from the S. C. S. are a little high because some of the labor has been of low quality. A good idea can be had from the estimates, tho.

Plowing and clearing cost about $3.50 to $4 an acre. Total cost of fencing, building ponds for livestock and liming runs from $15 to $25 an acre. The original average cost of the land was $8 an acre, the appraised value when purchased back in 1939. Thus the total cost of such land has been about $35 an acre. If sold today on a higher land market the cost of the project would probably pay out. However, the benefits from the program grow from year to year. Full benefits can be seen only on a limited acreage and the land is in all stages of progress.

One of the interesting comments made by Mr. Statton is that the use of nitrogen fertilizer is more costly but speeds up the progress a great deal. Now that the S. C. S. can harvest its grass seeds from government land the plan is to spend a much larger part of the yearly budget on nitrogen fertilizer. At first chiefly phosphate and lime were used, with small amounts of potash and nitrogen.

The Cedar Creek project has done such a good job of demonstrating how land can be brought back to productive grass that the methods being used are spreading to adjoining farms.

The Cedar Creek project is not to demonstrate that the Government should buy up marginal land and operate it. Rather the demonstration is to show how such land can be restored to productive farms.

Turkeys Fed Grass Clippings Gain Weight

Condensed from Science for the Farmer

P. H. Margolf

If a turkey grower ran short of feed for his birds, he might not think of a lawn, of a village park, or better still, of a golf course as an aid in solving his problem. In recent trials, grass clippings, sometimes obtainable for the hauling, have proved a useful addition to the rations of growing turkeys.

Turkeys are grazing animals and apparently get much benefit from grass. Grass is readily grown on most farms if it is not obtainable as a waste product. Many growers already are of the opinion that the disease hazard as well as losses from theft and vermin are reduced by keeping growing stock in confinement on wire. The advantages of growing birds on range where they can harvest their own grass may be counter-balanced by keeping birds in confinement and bringing in cut grass to feed them.

In these tests, birds given green feeds consumed more total feed but less mash, the high protein material that must be purchased. Those fed grass clippings required slightly more feed per pound of gain, but they gained more rapidly than did lots which received no grass and were heavier and more thrifty at the end of the growing period.

Experiments conducted in 1943 probably are representative of results that may be expected from feeding green feed in several forms to growing turkeys. During that season drying facilities were available at the station and considerable quantities of grass clippings were artificially dried and stored for later use. When used, this dry material was soaked over night and fed in a moist condition. Growers should not underestimate the amount of green feed which a group of turkeys will consume. In this case the supply of dried grass proved insufficient, and supplementary high grade alfalfa hay was required.

General set-up of the test—Four groups of 88 White Holland poults hatched on July 7, were brooded in four 12-by-16 foot brooder houses. All poults were sexed on August 4, when they were four weeks of age. The poults from the four pens were divided into two groups of males (Pens 1 and 3) and two groups of females (Pens 2 and 4) respectively. On September 1, when the

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poults were eight weeks of age, these four groups were transferred to 16-by-24-foot pens equipped with floor sunporches, 8-by-24-feet. They remained in these quarters until they were 28 weeks of age.

All poults were fed the Pennsylvania State College starter mash until they were eight weeks old; then developer mash was fed until the end of the experiment.

When the poults were four weeks old, whole oats was put before them. At twelve weeks whole wheat and corn also were fed in separate hoppers. Mash and grain were kept before the birds at all times. Cut green feed was fed to Pen 3, males, and Pen 4, females, in weighed amounts.

Fresh cut grass clippings from the College golf course were fed to the birds from August 4 to October 12, a period of ten weeks. The clippings were obtained every other day and analyzed over 30 per cent protein on a dry weight basis. One hundred birds at 16 weeks of age consumed 50 pounds of these fresh clippings daily.

During the spring and summer an excess of the grass clippings was dehydrated in a cabinet dryer equipped with trays heated by steam. The dried grass clippings analyzed 31.8 per cent protein, 80,600 U. S. units of Vitamin A in the form of carotene, and 12,500 micrograms of riboflavin per pound. This high carotene and riboflavin content may constitute much of the added nutritive value of this kind of feed.

The dried clippings, soaked in water over night and fed to the birds on the following day, were very palatable. The quantity of dried grass was soon found to be limited and the amount consumed by the birds was more than had been anticipated. Therefore some fine quality hammermilled alfalfa hay was prepared and fed in the same manner as the dried clippings. Ground alfalfa did not appear to be as palatable as the dried grass and, of course, less was consumed. From October to January 18 a mixture of dried grass clippings and hammermilled ground alfalfa hay was fed as the green feed supplement. All calculations of green feed were made on a basis of dry weight.

Heavier and of better quality—Feed consumption data, table 1, shows that male birds which re-

Table 1 — Pounds of Feed Consumed per Average Turkey

		Mash	Oats	Wheat	Corn	Green Feed	Total
Pen 1	Males	46.7	33.2	12.4	1.0	—	93.3
Pen 3	Males	44.7	30.5	10.0	9.1	10.8	105.0
Pen 2	Females	29.6	29.5	7.2	2.2	—	68.5
Pen 4	Females	28.5	26.2	10.0	4.6	7.2	76.7

ceived green feed consumed more corn than those not fed the green feed. Differences in mash, oats, and wheat consumption were not significant.

At the end of 28 weeks, table 2, the males which were fed grass clippings averaged more than a pound and the females a half pound heavier than those which received no green feed. On the basis of U. S. Standards and Grades of Live Turkeys in use in 1943, nearly one-third of the males and over two-thirds of the females were Grade A market birds.

Practically all birds in Pens 3 and 4 had good feathering and were in condition to slaughter. Examination of the dressed birds showed that groups fed the green feed retained a high degree of pigment in the skin, while very little pigment was found in the skins of those not given green feed.

Apparently birds in confinement fed green feed gain weight and obtain better market quality more rapidly than those which are not allowed this kind of forage.

Table 2 — Average Body Weights of White Holland Turkeys at 28 Weeks

	Sex	8 Weeks	16 Weeks	28 Weeks	Treatment
Pen 1	Male	2.03 lbs.	8.1 lbs.	18.0 lbs.	No Green Feed
Pen 3	Male	2.06 lbs.	9.0 lbs.	19.2 lbs.	Green Feed
Pen 2	Female	1.79 lbs.	6.0 lbs.	11.9 lbs.	No Green Feed
Pen 4	Female	1.78 lbs.	6.8 lbs.	12.3 lbs.	Green Feed

Mastitis Can Be Controlled

Condensed from The Jersey Bulletin

J. G. Cash
University of Illinois

MASTITIS can be controlled. At least that is the opinion of co-operators in the Illinois Correct Milking and Mastitis Control Program.

A Kane County co-operator stated, "I have shipped at least 50 cows in the last 10 years because of udder trouble. My losses were so great that I lost interest in breeding good cattle. Since starting this program a year ago, no new cases of mastitis have developed in my herd."

A DeKalb County co-operator said, "Our first test made 10 months ago, showed seven positive or suspicious cows. We have not had another cow show up on the test nor give flaky milk since starting the program."

The experiences related by these men are typical of those reported by co-operators throughout the state of Illinois. Where the program has been followed in its entirety, practically no new cases of mastitis have developed. The results of the microscopic tests run at regular intervals bear out the observation of the co-operators.

The Illinois Correct Milking and Mastitis Control Program was planned by and is under the direction of Dr. Robert Graham, head of the Department of Animal Pathology and Hygiene and Professor C. S. Rhode, Extension Dairyman, of the University of Illinois, College of Agriculture.

In the spring of 1944, seven veterinarians were employed and located in the major milk producing areas. In co-operation with the county farm advisors, and the local representatives of the Illinois Agricultural Extension Service, a few demonstration herds were selected in each county in the area. The veterinarians have collected samples at regular intervals from each cow in these herds and sent them to the Animal Pathology and Hygiene laboratory where microscopic tests have been made.

The veterinarians have assisted the co-operators in inaugurating and following a definite program which includes proper feeding and care, strict barn sanitation, herd management and correct milking.

The feeding practices recommended are the usual ones—namely, feeding all the good

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roughage cows will eat, feeding a grain ration properly balanced for roughage being fed, feeding grain ration according to production and giving special attention to the feeding of cows when dry and at freshening time.

Some of the points stressed under barn sanitation and herd management are using superphosphate, lime or limestone on barn floors, protecting the udders by keeping cows out of mud holes, using plenty of bedding to avoid injury and exposure to cold floors, and milking infected cows last.

The correct milking program includes the following steps:

1. Feed cows before or after milking—not while milking.

2. Wash udder and teats with 130° F. chlorine solution (250 ppm.). The process of washing the udder should be continued until the cow lets her milk down. A separate cloth should be used for each cow.

3. Immediately after the let down of milk, use a strip cup to further aid the let down of milk and to check for flaky milk. One or two full hand squeezes from each teat is sufficient.

4. Attach milker and leave machine on for only 3 or 4 minutes. Be sure that milker is taken off cows that milk out in less than 3 minutes as soon as they are dry.

5. Machine strip or strip by hand, using a full hand squeeze.

6. Rinse teat cups in cold water and then in warm chlorine solution (250 ppm.) before putting machine on each cow.

7. Immediately after milking, dip teats in chlorine solution (250 ppm.).

8. Keep vaccuum and rate of pulsation in accordance with recommendations of the manufacturer of milking machine used.

In carrying out the above program, most co-operators have found it most convenient to use some sort of cart for the equipment. Many types are in use, varying from a wide board with old roller skate wheels attached, to a platform mounted on a baby buggy chassis or coaster wagon. Four pails are placed on these carriers. In one pail are kept the cloths in warm chlorine solution; another pail is needed for the used cloths and the other two contain the cold water and chlorine solution used in dipping teat cups between cows. The strip cups may also be carried on the cart. It is recommended that when starting the program 3 minute egg timers be mounted on the cart for use in timing the machines.

The summary of the results of the first microscopic tests made on the demonstration herds showed them to be problem herds, in so far

as mastitis was concerned. Ninety-nine per cent of the 330 herds contained positive cows and 43 per cent of all cows were positive. That results have been obtained in these herds is evidenced by the fact that at the end of 10 months on the program the incidence of mastitis in these same herds is down to 22 per cent. This decrease in infection has been realized for the most part through avoiding the development of new cases in cows that were clean and in 2-year-old heifers that have freshened.

During the months of February and March, 1945, approximately 2,500 Illinois dairymen attended meetings held in the barns of co-operating dairymen at which the mastitis problem was discussed by the veterinarian in charge of the herd and a representative of the dairy department. Most important of all was a demonstration by the co-operating dairyman of the procedure followed and a discussion of his results obtained. To give further coverage in the state on this program, 12 county-wide meetings with a total attendance of 1,000 were held in counties not reached by the district veterinarians.

The results of this program as based on the comments of co-operating dairymen and the records of the veterinarians can be summarized as follows:

The spread of mastitis within herds has been checked, less trouble with flare-ups and flaky milk from infected cows, less time is required to milk, and a better job of milking is being done, more pounds of valuable milk are being produced and greater returns are being realized from the dairy enterprise.

"Mud-Ball" Seeding

Broadcasting grass seed by airplane is an alluring idea—you can get over so much territory in a little while.

The trouble has been that the seed has been too light to allow an even job. A California scientist, Dr. L. S. Adams, thinks he has this licked. He puts the seed, and even some fertilizer, in small clay pellets. They drop (and stay) where he wants them. Most of the experimental work has been done in Texas, including the sprawling million - acre King Ranch.

Adams claims he can sow up to *20,000 acres an hour* by plane (at $1.50 an acre) and do a good job. —*Farm Journal*

Two Point Pork Methods

Condensed from Capper's Farmer

A PORKMAKING project involving 50 to 80 litters annually and a 1-man crew requires definite organization and unvarying procedure. K. M. Wagner has developed such a method. Otherwise he would become bogged down in the maze of pig-tending details, chores and field work on the quarter section in Johnson county, Iowa.

Essential features of his method are a definite system of hog raising and equipment specifically adapted to that system. Together they constitute a practical application of work simplification. Yet the principles which he observes are common knowledge, evolved by years of scientific research and farm practice. Wagner merely put them together in a way that saves him work.

With the profit-taking hazards of porkmaking — small litters, high brooding losses, diseases and parasites, neglect, slow gains and feed waste—he can take no chances. His project represents too much of his effort, too much of his farm output. The system reduces those risks to the minimum; his equipment makes that possible.

To insure profitable litter sizes and pig vigor he adopted a system of crossbreeding, an O. I. C. boar on Hampshire-Duroc sows. To prevent brooder losses he observes strict sanitation, feeds sows a milk-producing diet, and uses electric brooders. Weanings average 8 to 9 a litter, or 1 to 1½ less than farrowings. To avoid feed waste and delayed finish, he pushes porkers to 225-240 pounds at 6 months or a little older. The ration consists of self-fed shelled corn and a protein mixture consisting of 200 pounds meat scrap tankage, 100 pounds linseed meal, 100 pounds soybean meal, 80 to 100 pounds alfalfa meal, plus salt and mineral.

Pigs are farrowed in 3-sow colony houses on concrete slabs and at weaning time sows are removed to pastures or other quarters. Shotes remain on the slab 3 months and are then transferred to a covered feeding floor for finishing.

Wagner maintains 2 groups of sows and practices 3 farrowings a year. Nine-month gilts are bred early in August for December farrow. After they have weaned their litters they are carried 3 or 4 weeks and bred for June farrow. March and April gilts are

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bred in November for March farrow and rebred within 3 or 4 days also for June farrow. Some of the sows are sold after their second litters and a few held over. Object of the June pigs is to get away from September litters which interfere with those of December.

Farrowing facilities include 2 slabs, each 17 by 65 feet, with gutters on the south side, and an automatic water system. Three 3-sow houses are lined up on each of the slabs with their backs at the north edge. These houses are 8 by 18 feet and essentially the shape of a quarter cylinder, with 4 windows and a sow door in front and service doors in each end. Rafters are built up with 5 thicknesses of fir bats, glued and nailed, to make them 2¼ by 1½ inches, and spaced on 2-foot centers. Sheathing is glued and nailed to them and overlaid with building paper and roll roofing. End and front walls are double and insulated with paper.

Houses of this construction are usable for chick brooders and each will accommodate 300 to 400. Four of them set end to end, with doors removed and the openings sealed with strips of tar paper are converted into a laying house. Pits, roosts, nests, feeders, water stands and other chicken furniture are removable. One is used for lambing.

For farrowing the houses are set 3 feet apart and with short board panels between, they form a north side windbreak and fence. South side and end fencing and pen partitions are made of panels supported by steel posts which slip into sockets in the concrete. Panels were made 30 inches high so they can be straddled to avoid opening gates in going from pen to pen. That saves time.

An electric hover, equipped with 100- to 200-watt globe, according to weather severity and age of pigs, is provided in a corner of each inside pen. The houses and hovers have enabled him to save pigs in 10 below zero weather.

When pigs are 2 weeks old, he provides a creep by lifting a partition panel and setting brooder hovers in each of 2 outside corners of the house. Later the pigs are supplied from rotary feeders on the outside platform. Pigs remain on the farrowing slabs 3 months.

To provide finishing facilities he remodeled an old half-monitor hoghouse by installing a concrete floor, an 8- by 16-foot corn bin with built-in self-feeder, a water system and manure carrier. On the south side he built a 10-foot slab floor with loading chute and cutting pen arrangements. However, he rarely uses the outside strip since the inside is much easier to clean. Hogs get their

protein mix from rotary feeders and their corn from the built-in bin. In the water system he provided a spray under which hogs may duck or loaf at will in hot weather and they never pant.

A combination machine shed and granary was remodeled to provide 2,000 bushels overhead storage. Grain is elevated by feed mill blower and spouts by gravity into the mill hopper or wagon boxes. With this arrangement he has reduced the customary 4 to 6 handlings of grain to 1.

Since watering is one of the greatest time consumers in caring for hogs, he has made automatic supply available wherever possible. A deep well and pressure tank connect with 1,500 feet of pipe leading to buildings and farmstead lots. To supply hog pastures he ran a line under the road and by plow furrow 60 rods thru a cornfield, thence on the surface along a pasture division fence. Laterals led to automatic fountains mounted on skid platforms which were pulled over postholes to provide splash drainage. A hose connection was provided for filling a combination dipping trough and pig bath.

This line supplied 3 pastures on each side and one at the end for growing gilts and for resting or gestating brood sows. As an example of Wagner's precautions against disease and his strict observance of sanitation, he does not permit visitors on foot or off-the-farm vehicles to enter the pasture or any lots where his hogs are quartered.

You Can't Go Wrong with Wong

Condensed from New Jersey Farm and Garden

C. S. Garrison and R. S. Snell

WONG barley is making a name for itself. The variety has created more interest among the winter barley growers in New Jersey than any other strain previously used. Rightly, too, for it has many characteristics which make it highly desirable for many farms. Briefly, Wong has given *better-than-average yields,* has a *stiff straw,* and is *resistant to* some *diseases.*

Wong is a true six-rowed short-bearded variety. The compactness of the head may fool you at first, but upon examination the number of kernels per spike will often be 80 or more. It is the high number of kernels per head that make it a good-yielding strain.

This variety was developed from a barley selection brought to this country from China by Dr. H. H. Love, of Cornell University. After thorough testing, Wong was released to New York farmers in 1942. From that time on it has had a very spectacular rise in popularity.

Wong has now been tested by the Experiment Station for three years at New Brunswick, N. J., and in a number of counties where winter barley is important. In addition, a number of farmers have grown this variety and have been pleased with the excellent yields. This new variety bids fair to become the most popular in the state. In tests at New Brunswick in 1943 and 1944 Wong gave the highest average yield as shown in the following table:

Summary of Winter Barley Variety Trials at New Brunswick (1943 and 1944)

Variety	Bu. per Acre	Straw	Maturity
Wong	54.6	Stiff	Late
Maryland Smooth-Awn	43.8	Med.	Med.
Tennessee Winter	39.8	Med.	Med.
Kentucky No. 1	38.8	Weak	Late
Nassau	36.2	Med.	Med.

These results are borne out by reports from farmers who produced as much as 70 bushels per acre. Furthermore, the weight per bushel was equal to the other varieties commonly grown in the state. For farmers who want plenty of straw it is one of the heavier producers.

Another advantage which makes Wong desirable is its stiffness of straw. It should be understood that this variety can be blown down by wind and rain, but it has a much stronger straw than any other variety now adapted to

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New Jersey. It stands erect and combines well. Wong's stiff straw makes it a good companion crop for seedings of grasses and legumes. Since there is less chance of lodging with Wong, smothering of the new seeding seldom occurs.

Another strong point in favor of Wong is its resistance to mildew, a disease which attacks the leaves and stems of barley during the growing season. This disease prevents maximum yields in most varieties. Because of its resistance to mildew the straw from Wong barley is of much better quality than that obtained from the other varieties.

Loose and covered smut attack Wong like any other variety. However, the covered smut can be controlled easily with Ceresan, while loose smut can be prevented only by hot water treatment or the planting of disease-free seed. The New Jersey certification program for barley requires that seed planted to produce a certified crop must be hot-water-treated. Certified Wong barley seed now being produced will be practically free of this disease.

Wong matures somewhat later than Maryland Smooth-Awn or Tennessee Winter. This may be an advantage or disadvantage, depending on the crop rotation being used on a particular farm. As it matures later any real conflict with hay-making is avoided. However, on the farm where a second crop, such as soybeans or Sudan grass, is to follow barley the late maturity may prove a disadvantage.

The cultural practices for growing Wong are similar to those for any other barley. It appears, however, that Wong responds best to high fertility. In a general rotation where heavy amounts of fertilizer or manure have not been used previously 300 to 500 pounds of 3-12-6 or 4-12-8 should be applied with the barley at seeding time. This amount is in addition to the 300 to 600 pounds of 0-12-12 or 0-14-7 fertilizer normally added in seeding down the grasses or legumes where barley is being used as the companion crop.

The proper date and rate of seeding is just as important for Wong as for other barley varieties. In general, barley should be seeded 10 days to two weeks earlier than the normal date for planting wheat. The best rate of seeding is about two bushels per acre.

The successful growing of Wong barley depends upon the use of good seed, good cultural practices, and insect and disease control. Where these production requirements are met, Wong can be grown satisfactorily and like any other barley affords a good grain feed for any livestock farm.

So You Expect Your Cows To Make Money!

Condensed from The Ohio Farmer

E. W. McMunn

WILL your dairy herd make a profit in 1947? In 1950? You don't know? Neither do we. But we're sure we can spot, now, right here in Ohio, some of the herds most likely to make a profit in those years. And we can tell you some of the reasons why those herds will be profitable. Sounds as if it should be possible to get started now with the kind of a dairy program that would almost insure a profit, doesn't it? Yes, that is exactly what we believe some of these herd owners are doing.

Wartime need has pushed up demand, and with it the price, until today almost any old cow will make a little money for her owner. Dairy cow numbers have increased, heifers have been saved to add to milking herds, and culling has been less rigid. With the need for a larger supply of dairy products has come some relaxation in insistence on quality. But some day these things are almost sure to change.

Let's have a little preview of this profitable dairy herd of 1950. First, it will be a herd pastured on good grass and with grass thruout the pasture season. We know that the cheapest milk is made on grass. And yet, it is the exception when we find cows having an abundance of green, nutritious, well-fertilized pasture and so arranged that the supply is adequate from early spring until late fall.

So, we will have to follow the lead of the good farmers who are fertilizing and liming their pastures. These treated pastures stand out like an oasis in the desert when compared with our run-out and over-pastured areas. Here is probably one of the best ways to invest money now for after-war profits. And with this good pasture must go an adequate supply of high-quality mixed legume hay for winter feeding.

But it will take more than good roughage to make a profit with our dairy herd of 1950. It will also take good cows. And the heifers in your herd, and the calves soon to be born, will be your dairy herd of 1950.

Hundreds of Ohio dairy herds have produced an average of 400 pounds butterfat or 10,000 pounds

Reprinted by permission from The Ohio Farmer, July 7, 1945

milk per cow per year. And yet, last year Ohio ranked down in 19th place with an average production of only 4620 pounds milk per cow. California led with 7000 pounds.

Herd test records have proved that low-producing cows cannot make a satisfactory profit. If we want our herd of 1950 to be profitable we must get production, and get it from every cow. That means we must test our cows. Until we test more cows we're not going to be sure that we have many herds with the production it will take to keep up that dairy profit.

And then, even tho we find out which cows are profitable, we'll still need to produce a lot of calves with the ability to grow into heavy-producing heifers and cows. This means we'll have to make full use of well-bred seed stock for it is here that we have the greatest chance of getting the performance we are looking for.

Whether we make use of a good bull by joining an artificial breeding association or a pure-bred sire backed by ancestors of known production is unimportant. The main thing is to get that good breeding and start now to make full use of it.

And after we get good production, and cut cost by our program of feeding an abundance of good roughage, the job is still not done! We'll have to produce milk and all other dairy products with quality so high that city customers will want to buy.

Dairymen have regarded oleomargarine and its growing acceptance by the general public as a threat to their industry. And well they may! But there is little reason to expect full consumer support for the dairy industry while any poor-quality milk and butter is finding its way into the market. There is just no answer to a housewife who says that she buys oleomargarine because it is of uniformly better quality than some of the butter she has been getting.

Milk and cream quality start at the farm. The best butter maker in the world cannot make a premium butter from cream that is sour, rancid or moldy even before it leaves the farm. If our dairy herd is to make money we must follow a careful program of cleanliness, prompt and thorough cooling, and protection of the product until it reaches the processing plant.

But we still don't have our dairy products sold. And here is one place where some other industries have far outstripped the dairy industry. They have SOLD their product. It's true that several organizations have given valiant service in the drive to make

consumers want dairy products, but much is yet to be done.

It's only necessary to look at some of the promotion for products such as California citrus or Washington apples to see what a great industry can accomplish by organized effort.

Nitrogen is the Growth Element

Condensed from California Cultivator

R. E. Stephenson

NITROGEN deficiency is the most common and perhaps the easiest of all to identify. Without adequate nitrogen plants make only small, weakly, off-color growth, with all the signs of stunting and starvation. The symptoms may vary a little in different types of plants and may vary greatly in degree in all plants. Severe nitrogen deficiency may result in failure to set fruit, or in leaf and fruit drop, or in small fruit that ripens prematurely.

Severe nitrogen deficiency together with a shortage of moisture results in "firing" of corn and other plants. The lower leaves of the plant die completely and few ears form. Legumes may show nitrogen deficiency where inoculation does not occur. Deficiency may appear at any season of the year. There may be enough nitrogen to grow a fairly good potato vine but the formation of the tubers may be stunted because of an inadequate supply.

Nitrogen deficiency may be due to a generally low level of fertility in the soil. The reserve nitrogen supply of the soil is mostly in the humus. A humus-depleted soil is likely to produce crops with symptoms of nitrogen starvation. Plowing under excessive amounts of straw or other carbonaceous matter and planting a crop immediately, may result in temporarily severe nitrogen deficiency. This condition can be prevented by applying a nitrogen fertilizer such as ammonium sulphate or Chilean nitrate at the rate of about 100 pounds for each ton of straw plowed under. Long periods of cool, wet weather, which interfere with nitrate formation in the soil, may result in deficiency. Sandy soils and those that are quite acid are commonly deficient in nitrogen.

Abundance of available nitrogen is indicated by a healthy, dark-green foliage, thick stems, large leaves and rapid growth. Over-abundance of available nitrogen is indicated by soft, succulent growth that makes the plant more susceptible to disease and insect ravages. Excessive ni-

Reprinted by permission from the California Cultivator, July 21, 1945

trogen tends to retard ripening, and may delay coloration of fruits.

Nitrogen deficiency is relatively easily and quickly corrected. Within a week after a nitrogen fertilizer is applied, the effect may be noticed in improved growth and better color. The quickest effect probably will result from applying nitrogen fertilizer in solution but the fertilizer can be applied dry and irrigated into the soil. A moderate nitrogen fertilization will reduce the amount of irrigation necessary for lawns but liberal use will probably more than double the necessary frequency of clipping. Pasture lands respond wonderfully to nitrogen fertilization when there is adequate moisture.

All plants use large quantities of nitrogen for growth which cannot occur without the formation of proteins, and proteins are approximately 16 per cent nitrogen. Each bushel of grain contains about one pound of nitrogen, and the straw for the grain contains a half pound. Some plants and some fruit trees have a voracious capacity to utilize nitrogen, almost never seeming to have too much. Other plants, such as oats, are easily overfed; there is too much straw, lodging occurs, the heads do not fill well and a disappointing harvest results.

Grasses for hay or pasture are not easily overfed with nitrogen. For seed production, grasses should receive just enough nitrogen for good growth without lodging. This produces the maximum of good seed. Some plants, as tomatoes, in the early growth period need a moderate amount of nitrogen to produce a vigorous plant, but when the fruit begins to set, more liberal nitrogen fertilization is desirable for a big harvest. The extra nitrogen may be applied as a side dressing. Legumes grown for soil improvement or for hay and seed, seldom need nitrogen fertilization. Green beans for the market, however, may respond in yield and quality to nitrogen fertilization.

Because nitrogen is the growth element used in relatively large amounts by plants, application of a fertilizer that does not supply nitrogen may give disappointing results. Nitrogen, therefore, is likely to prove the first limiting element and only when this deficiency is corrected may an appreciable response be obtained from correcting other deficiencies. However, all deficiencies whether phosphorus, potassium, manganese, zinc, boron, calcium, magnesium or iron, must be corrected for maximum growth. On soils well supplied with minerals, nitrogen may be the only element needed for good production.

The California station reports

data indicating that a small amount of nitrogen, half a pound per tree on oranges, may about double the yield. One pound of nitrogen per tree increased the yield two and one-third times. Two pounds two and one-half times and three pounds per tree made two and three-fourths times as great a yield. The economic limit for the use of nitrogen depends upon the value of the product. Grain at one dollar per bushel would not justify heavy fertilization but hops at 75 cents a pound would more than pay for liberal application if yield increases were obtained.

How Champion Layers Are Managed

Condensed from Poultry Tribune

R. C. Ogle
Cornell University

WHAT follows is a description of management practices that are used at the Western New York State Egg Laying Test. At the start, may I point out that the noteworthy records produced by birds and pens in the past 13 years at this test are distinctly the result of good breeding. The well-bred pullet, delivered to the laying test at a satisfactory stage of maturity, can make good progress in egg production from that time forth if she has access to a supply of mash and grain and in other ways is managed by a caretaker who has good "chicken sense."

The one fact uppermost in the mind of every good poultry keeper today is that of sanitation and the disease problems that are attributed to poor sanitation. I am of the opinion that this factor of controlled sanitation is a *first* in securing championship egg production.

In the construction of the laying test, my most urgent desire was to house the birds for comfort and health and let egg production be a second consideration. Accordingly, the facilities at this test provide the housing of each individual entry in a pen unto itself and without contact with any other birds.

Secondly, 13 birds are housed in a pen providing 96 sq. ft. of floor space. In addition, the building is operated with a modified plan of the Cornell rafter ventilation system and it works just about 100 percent. I have visited the test when the outdoor temperature was 30 degrees below zero

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and when the outdoor temperature was 98 degrees in the shade, and under both of these extreme conditions, plus all of those in between, the birds in these pens are the most contented chickens I ever have seen. No birds ever have had frozen combs and no birds ever have been suffocated by the heat.

Additionally, the construction provided a concrete platform in front of all pens. Visitors can view the birds and interior of the pens without ever going into a pen. In fact, no one is permitted to go into a pen except the caretaker. This rule even restricts an owner from going into the pen where his birds are located. Also, shipping coops are uncrated on the concrete platform and never taken into the pens.

Since the start of this test 14 years ago, there never has been a contagious disease problem at the test. For many years, all pullets upon arrival at the test immediately were vaccinated for fowl pox with pigeon virus vaccine. Also, all birds immediately were bloodtested for pullorum by the tube agglutination method and all suspicious or positive reactors removed from the test. For the past two years, because of the shortage of labor, it has been impossible to carry out the vaccination and bloodtesting program. We have urged cooperators to take these precautions before sending the birds to the test and a good percentage of them have followed this plan.

At the end of the test year, each pen is given a thorough dry cleaning in the removal of all filth, dust, litter, etc. Directly thereafter, the concrete floors and all equipment which is portable are soaked and scrubbed with a hot lye solution. At this same time, the perches are painted with carbolineum. After the pen has been aired and dried, the equipment is returned to its proper position and six inches of fresh, clean straw is placed on the floor of the pen and clean shavings are placed in the nests. Each piece of equipment is identified for its respective pen and no interchange ever takes place.

Upon arrival of the new pullets, they are provided with a hopperful of mash and a hopperful of grain, and with a supply of grit and of oyster shell. I should qualify the term hopperful because, actually, we never fill the hoppers full. They are filled to approximately one-half capacity and fresh feed is added daily. The utmost care is exercised in having the birds eat up all of the oldest feed. Small quantities of grain are litter fed daily, principally to induce activity and to break up and distribute the litter.

A small quantity of additional

litter is added about twice each month until by December and, before the arrival of the coldest weather, there is a subtantial built-up litter condition. The pens are never wet. Dropping boards are cleaned weekly, and as ample roost space is provided for the number of birds in the pen, there is never an over-accumulation of droppings.

The roost section is covered with wire netting and the birds are prevented from ever reaching the dropping boards. When the dropping boards or pens are cleaned, this material is hauled away immediately from the laying test to neighboring farms. Consequently, there is no accumulation of poultry manure or litter within a half mile or more of the birds at the test.

All feed is delivered to the service building and no feed bags ever are taken near the pens where the birds are housed. Only new egg cases are used or permitted on the grounds. Only the full-banded birds that constitute the competing pen are permitted. Some of the mortality at egg laying tests is, in my opinion, the result of permitting in the pen rejected or disease-carrying individuals that are the extras or substitutes sent to the test.

In each pen there is provided a collapsible broody coop. When not in use, the coop folds tightly against the wall. When needed, it is opened above the perches whereby the wire roost section provides the floor. Whenever a bird goes out of condition, she immediately is placed in the broody coop and thus kept confined within the pen. While confined, she is given special care and observation daily. This does not mean pampering and use of a lot of time by the careaker but, instead, means easily done things to provide recovery of the bird to a normal condition.

If the bird fails to recover and becomes a mortality, the bird is removed from the pen and placed in a freezer. After the carcass is well chilled, it is placed in a special corrugated box and forwarded to the poultry disease laboratory at the Veterinary College. Within a very short time, we have a complete report on the bird and are guided in any action needed to prevent further sickness.

The control method of feeding always has been used at this test wherein mash is kept available before the birds at all times. When the test starts on October 1, the pullets need a greater quantity of grain because of their needs for continuing growth even while egg production gets started; so we hopper feed grain. The length of time in which the grain is hopper fed varies from two

weeks to two months, but never exceeds the latter. We are guided in this by the fleshing and weight of the birds and the relationship of these to their rate of lay.

We always are concerned at the beginning of each test year to prevent loss of production due to molting and that due to loss in body weight. Stated another way, we feed to secure increased body weight, and to keep pace with the constantly increasing production. After the period of hopper feeding grain, grain is fed in the litter daily just before roosting time, and we feed all that the birds will consume without leaving any in the litter.

The two principal facts that we aim to fulfill are: First, an approximate food intake of between 40 to 45 parts of grain and 55 to 60 parts of mash; and, second, a total annual intake of not less than 90 pounds of total feed per bird and as much more as may be required for increasing production. Actually, the laying test figures indicate that 100 pounds of feed are required for 200-egg production and a body weight at the end of the laying year approximately one pound greater than when the pullet was housed. This system of feeding has produced high average egg production, together with high individual and pen production — in some cases, world records.

Acknowledging that egg size is an inherited factor, nevertheless there appears to be some justification for crediting management and feeding with influencing egg size when holding to a restricted upper weight as used by the laying tests.

Our program of both management and feeding is intended to be of the most simple operation. The only supplemental feed that ever is given to the birds at the test is liquid milk. The plan that we always have followed is to use dry powdered skimmilk made into a liquid solution in a concentration ranging from one pound of milk to four pounds of water to one pound of milk to eight pounds of water, depending upon the rate of production and the time of year. The liquid mixture is fed by pouring it directly on top of the mash in the hopper. No other supplement of any kind ever is used.

Water from a never-failing artesian well is piped to each pen. Water pails are scrubbed each day and disinfected frequently.

We are now using a 25-watt bulb without a reflector in each 8 x 12 pen, and increase the amount of light as the season advances so that we may most nearly maintain 13 hours of light, including both natural and artificial, for every day in the year.

Reducing the Gamble in Farming

Condensed from Michigan Farmer

Floyd B. Himes

Michigan State Director, Federal Crop Insurance Corporation

EVER since the time of Benjamin Franklin farmers have thought about means of protecting themselves from crop losses. Beginning in 1889 several private and state owned companies ventured into the crop insurance business; but writing protection against all growing hazards from planting through harvest proved to be a pretty tough job—requiring detailed information on crop yields, a lot of money and wide participation. As a result those efforts failed.

The federal government began to investigate the possibilities of all-risk crop insurance in 1920. But it wasn't until 1939, after the bad drought of 1934 and 1936, that crop insurance for wheat was approved by Congress and offered to farmers for the first time. It had wide participation in Michigan during the 5 growing seasons in which it was offered, and many farmers benefited from its protection. In fact, over 50% of the farmers growing wheat in the major wheat counties of Michigan carried this insurance. In the spring of 1943, Congress failed to make any appropriations for administering this program, and crop insurance was not offered on the 1944 and 1945 wheat crops. The failure of crop insurance was due to about 4 causes: first, too low participation in some of the major wheat states; second, faulty loss adjustments; third, insuring more than the law provided; and fourth, faulty yields and rates on the insured crops. As a result, losses amounted to more than the premiums collected.

In the dying days of the last Congress crop insurance was revived. Changes were made in the old act which it is thought will make it more sound and more stable.

The new program provides for all-risk crop insurance in 1945 on wheat, cotton and flax, and further provides for trial insurance on corn and tobacco—in not to exceed 20 counties. In addition, provision is made for 3 additional experimental crops for 3 years. The legislation also makes it necessary to obtain 50 applica-

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tions per county, or one-third of the growers normally growing the crop to carry on the program in any county. It further provides that after 1949, if the losses exceed the premiums they must be pro-rated.

Hillsdale was the Michigan county selected for trial insurance with the result that 1,338 farmers covering 1,478 farms have made application for this all-risk protection.

Crop insurance provides protection in loss of yield, due to all natural unavoidable hazards; such as, fire, hail, drought, flood, winterkill, insects, wind damage, too much rain, snow, freezing, disease, etc.

Any farmer who takes out crop insurance is guaranteed either 50 or 75% of his average yield per acre. Premium rates and average yields are established for each farm on the basis of past production. Premiums are finally computed on the basis of the actual acreage seeded, and the producer signs a note that matures about harvest time. Payment of the premium may be made in cash, or if not paid in cash it can be deducted from AAA payments, commodity loans or from any indemnity the insured may get on his insured crop.

Any one who expects to have an interest on the insurable crop at seeding time is eligible to apply for insurance on his interest in the crop.

Premiums and indemnities are computed in terms of bushels. Bushels of the commodity are converted into cash by determining the cash equivalent of a bushel of wheat, flax or corn—whichever is applicable. Indemnities are paid by means of a certificate of indemnity which calls for so many bushels of the commodity. This certificate can be used to secure a commodity loan if desired, or held by the insured and later converted into cash in much the same way a grain warehouse receipt is handled.

The cost of administration of the program is borne by the federal government. Premium rates are established on the basis of providing only an adequate amount to take care of the actual losses.

Farmers are familiar with the way commodity loan programs put a "floor" under prices they get for their crops. Crop insurance will put a "floor" under crop production and guarantees security and protection of farm income. It is only by participation of a majority of the farmers that crop insurance can be soundly established. With a successful wheat insurance program once developed, it is but a step to the insuring of many other crops.

Stopping Cistern and Basement Leaks

Condensed from The Dakota Farmer

R. L. Patty

WET seasons always bring forth many letters of inquiry about stopping leaks in cisterns and basements.

In repairing any masonry wall that leaks, the best results will be had if it can be repaired or treated on the side next to the water. A concrete stock tank can best be treated on the inside for instance, because it is the side next to the water. On the other hand a basement wall leaks from the outside in, and can best be treated on the outside.

There is no miracle paint or liquid that can be brushed onto a masonry surface and make it permanently water-proof. They are all more or less temporary. Three homemade paints are probably as good as any for this purpose. They are cement-wash, hot asphalt, and hot tar. The easiest one to use, and probably the best one for inside cisterns or water tanks, is cement-wash. If brushed onto a clean moist surface, it will often last two or three years. Cement-wash, also called grout or cement-cream, is made by adding soft water to ordinary Portland cement until it is thinned down about like fairly thick cream. It is usually brushed onto the cement surface with a white-wash brush but a somewhat stiffer brush is better.

Hot tar and asphalt are applied in the same manner and roughly give about the same results. Tar should never be used on the inside of water tanks, however, because of its strong taste. Asphalt is not nearly as bad in this respect. The products can usually be bought at the lumber yard. Before using they are heated in a steel barrel or bucket over a slow fire. They should be watched constantly and removed from the fire, or the heat reduced, as soon as the material has become thin. They catch on fire very easily. Tar and asphalt is brushed on with a stiff brush with bristles more like a scrub brush. Neither the brush nor any of the containers will be useful for any other purpose after the first use. It is important that these also be applied to a clean surface.

For more permanent repairs mortar patches and plasters are used.

Where water leaks from a

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cistern, the repairs should be made on the inside surface. There are a few cisterns in this area that were made by plastering directly onto the soil. These cisterns are jug-shaped and are made by plastering two coats of cement mortar onto the soil. When leaks develop in this type of wall the best plan is to thoroughly clean and replaster the entire inside. If the trouble is from the water leaking out of the cistern this will usually work pretty well, but if there is trouble from water seeping into the cistern from the outside, it will probably be a waste of money.

For thicker walls of brick or concrete, the walls should be repaired by patching. After the wall has been cleaned thoroughly, a groove is cut along the check in the wall where the leak is found. These checks are usually very fine and can only be located with a flash light. The groove is cut with a cold-chisel and should be one to two inches deep and about the same width at the surface. This operation is something like filling a tooth and if a place or two is back-under a little, it will act as a key to hold the mortar patch. After this groove is cleaned out it should be filled with a rather stiff dry mortar and packed in good. The reason for having the mortar stiff is so that it will not shrink and leave a fine hair-crack around the edges. This mortar will be about like very stiff mud, which is about like the mortar used in making cement blocks. This mortar should be mixed of two and one-half measures of sand, one measure of Portland cement, and one-sixth (about 15 percent as much as cement) measure of hydrated lime. If the wall is made of concrete that is not too good, or if it is a brick wall that is plastered on the inside, it is not a bad idea to clean the wall all over and give it a good coat of cement-wash after the patching is done. A repair of this kind will also do fairly well at keeping the water from seeping into the cistern from the outside.

In repairing a basement wall to keep the water out, we have the water on the outside of the wall. If the water pressure isn't too great, the method used in the cistern might be tried, but it is generally best to work on the outside. This means digging a work trench around the outside of the foundation and cleaning the walls thoroughly. Plasters will not bond to a dirty wall any better than paints. If the checks in the wall are bad it may be necessary to groove and fill them with mortar as described for the cistern. The whole wall should be given two coats of plaster, mixed the same as given for the cistern. The wall should be sprinkled well before

plastering and the new plaster should be kept shaded to prevent drying and checking. The second coat should follow the first one after one or two days. After the plaster has thoroughly dried, the surface should be given a coat of hot tar or asphalt brushed onto the clean surface. Work with hot materials is best done in warm weather when the masonry wall is warm.

Fixing a concrete floor, so the water will not come in through it or around the edges along the foundation, is often harder than to fix the wall. If water is coming through the floor, it is probably coming in through the joints. No important amount of water will acually go through concrete, even thin layers of it, and no water will go through good concrete. Ordinary methods of caulking the joints in such a floor with hot tar or asphalt will stop only the milder cases where the water pressure is very slight. Bad cases require placing a new layer of concrete on top of the old one with built-up layers of felt paper and hot tar between, and with special treatment at the joints around the edges. An experienced man, who lays built-up roofing for flat-topped buildings, would be a good man to hire for doing this kind of a job. Several methods of handling these more serious basement problems are described in Farmers' Bulletin No. 1572 entitled "Making Cellars Dry." It may be obtained by writing the Superintendent of Documents, Washington, D. C., and enclosing five cents in cash.

When water leaches into a basement it means that there is ground water in the soil around the foundation that is under more or less pressure. If drain tile can be laid around just outside the foundation and just below the floor line, this is the sure way to fix a wet basement and nothing need be done to the walls or floor. The drain tile carry the water away and relieve the water pressure entirely. It will cure the worst cases. The tile should be laid about a foot or so outside the foundation and about six inches below the basement floor line.

In order to use drain tile there must be an outlet for them and this is not always available. By an outlet we mean that there must be a creek or low place within 60 to 80 rods from the house that is lower than the bottom of the basement. A slope of six inches in the line of tile will be enough. Since the tile are laid six inches below the floor line of the basement then the outlet should be 12 inches lower than the basement floor.

While looking for the cause of leaky basements it may be sometimes found due to poor surface

drainage around the foundation of the house. Grading around the house, to prevent any water from standing close by, may help. Water from the roof, that is not taken care of by eave troughs and downspouts, may increase the trouble also.

Pasture Farmer Champion

Condensed from Nebraska Farmer

GRASS, "the forgiveness of Nature," that John J. Ingles wrote about many years ago, is rapidly proving its importance in profitable farming. Farmers are not only getting pasture returns in the form of livestock products comparable to cash crops, but they are turning more and more to grass to tie down the top soil and check destructive wind and water erosion in a vast nation-wide conservation program.

To a young Nebraska farmer, John S. Steinauer of Pawnee county, comes national recognition for his outstanding example and success in grass farming. In June he was selected as the country's champion pasture farmer by the Breeders' Gazette, national livestock paper in Illinois, and presented with a gold medal in an appropriate ceremony at the Lincoln Chamber of Commerce.

Under a system of modern pasture management, all but 60 acres of 385 acres farmed by him are in grass. By religiously following a rotation grazing plan, Steinauer gets nine months of grazing a year. In 1944 one of his pasture set-ups of 108 acres, divided into four separate pastures, produced 10.375 pounds of beef cattle gains —96.1 pounds per acre—and was not nearly utilized to the limit of its grazing capacity. Scales placed conveniently near the four cornering pastures record the weights of the cattle as they enter and leave each pasture.

Mr. Steinauer is a young man, only 30 years old, and operates two farms owned by his father, W. A. Steinauer, Pawnee county banker. One of these farms, the home place, was settled by John's grandfather in 1856, which makes it one of the oldest farms in the state under the same family management. The grandfather, like the grandson, foresaw the menace of soil erosion on the steep hillsides of that section and wisely refrained from breaking up the hills. His son, the pasture cham-

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pion's father, fashioned his farming by the old pioneer's pattern, and now the younger man is traveling the same road, aided by recent developments and practices in good pasture management.

On the home place of 226 acres young John raises hogs and Holstein cows. Approximately 60 acres of the level bottom land is farmed. There is a 60-acre hay meadow and the remainder of the farm, hilly to rolling, is in pasture with a small woodland acreage. The other 160-acre farm is located two miles west of the home place and is entirely in grass. It is used as a beef cattle pasture and for two hay meadows.

John Steinauer is another one of those bromegrass boosters who keep the cash register hot with substantial profits from livestock and dairy production off pasture, but he does not grow brome exclusively. The farm has considerable amount of native grasses, principally big blue stem for pasture and hay.

A most important factor in good pasture management is ample fertility to stimulate the maximum growth and nutrients in grass. Bromegrass alone becomes sod bound a few years after planting. To prevent this, conservationist Steinauer plants alfalfa with brome to supply nitrogen.

The pay off in any pasture program is what it will produce in pounds of livestock products. The Steinauer plan is a perfect set-up. Dairy herd improvement records show that in 1939 his butterfat cost per pound was the lowest of any herd in the southeastern part of Nebraska. In a recent test his herd showed an average of 350 pounds of butterfat per cow.

The dairy pasture set-up consists of 21 acres of brome-alfalfa and 69 acres of native grass pasture. The brome-alfalfa is pastured in the early spring and late fall. Grazing is deferred on the blue stem pasture until early summer and is rotated between the two until the brome-alfalfa pasture will again be ready in the fall. No concentrate is fed the dairy herd while on pasture.

Hog pasture of brome and alfalfa is an excellent combination and here again a rotation system is followed between the two during the grazing season. The hogs are moved back and forth between the pastures according to forage conditions, which contributes to continuous succulent pastures, with sanitary, disease-free enclosures. The brome furnishes early grazing, the alfalfa during the summer months and the brome again in the fall even after the alfalfa freezes down. Eight to nine months of grazing is possible under this system.

Rotation grazing is followed on both farms. The dairy herd set-up has four pastures and the 160-acre tract has four separate pastures, one brome and alfalfa and three native grasses. In addition there are two native grass (big blue stem hay) meadows on the 160-acre farm. The windmill and well are located in the center of the quarter section, providing the cattle with easy access to water from either of the four pastures. Scales are located nearby to record the gains from grass as the cattle enter and leave each pasture. In case of drouth the hay meadow can also be grazed.

John Steinauer buys calves or yearlings of good beef type in the fall and winters them on hay and ensilage with a small amount of grain for the calves and one-half pound protein supplement per head daily. In the spring they are turned on the brome and alfalfa pasture. This year that date was April 6, and on June 6 they went to the first of the native pastures. They moved to the second native pasture the middle of July and about August 15 they will be put in the third native pasture and back to brome and alfalfa for late fall grazing. The cattle are sold as grass fat or go to the feedlot. On the beef cattle farm there are 34 acres in bromegrass and alfalfa and 74 acres in blue stem pasture.

John Steinauer's grass land program is outstanding for its completeness. There is no one spectacular result from a few acres of this or that. The entire 385 acres of land is a complete soil conservation plan worked out in cooperation with the Turkey creek soil conservation district. Except for the 60 acres of level bottom farm land, the land which is hilly and rolling is all in pasture and hay meadows, protected by terraces, contour furrows, grassed water-ways, gulley control, trees, wood lot improvements, and soil conserving rotations.

From this land use program, based on grasses and livestock, Mr. Steinauer, with the help of one hired man, produces approximately 4,200 pounds of butterfat, 40 or more yearling and two-year-old steers, and 125 hogs per year. In addition some grass seed and grains are sold as cash crops. From a field of brome and alfalfa he harvested one year 485 pounds of bromegrass seed and cut two tons of alfalfa per acre. The seed brought $70 per acre.

Fitting for Show and Sale

Condensed from The Shorthorn World

John C. Burns
Fort Worth, Texas

THERE are numerous ways of advertising purebred cattle, but, breeders have long recognized that, in effectiveness, none excels the show ring and the public sale ring. The advertising will be favorable or unfavorable according to the degree of excellence or inferiority of the cattle exhibited in the show ring or sold through the public sale ring. It naturally follows that in either case, the better the cattle the more favorable will be the advertising, as well as the greater will be the returns in premiums and prices. The importance, therefore, of having cattle properly fitted for show and sale can hardly be over-estimated. It is realized, of course, that anything which may be written along this line cannot take the place, altogether, of the valuable lessons learned in the school of experience, and, therefore, it is the beginner rather than the experienced breeder, who may be able to derive some helpful suggestions from this discussion.

There are mainly two factors upon which success in the show ring depends; first, the selection of a promising individual, endowed through good breeding with the right kind of possibilities, and second, the application of such feeding and care as will enable the animal to develop according to its possibilities. It is needless to state, that the best kind of an animal may prove an absolute failure in the hands of a poor feeder and, on the other hand, that the very best feeder will fail to develop a superior animal out of a scrub.

As a general rule, the development of a show animal of high merit must begin with the calf in the matter of feeding and care, though, of course the production of the right kind of calf must begin with the proper selection and mating of its sire and dam. It is always preferable to select calves that will show with as much age as the classes to which they belong will permit. Individuality, however, should not be sacrificed to accomplish this and such should not be necessary if cows from which show calves are to be selected are bred at the proper time.

At the larger shows junior and senior classes are provided for calves, and summer, junior and

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senior classes for yearlings, by sexes in each instance. The base date for junior calves and junior yearlings is January 1, for senior calves September, and for summer and senior yearlings May 1.

One can never foretell definitely, of course, how a calf will develop, but the selection of a good prospect can be made and it is of great importance that this be done. Whether breeding animals or steers, the general requirements as to type are the same. The wide, deep, medium lengthed, straight, parallel top and bottom lined, smooth from end to end kind, with straight, short legs, short neck, a neat, short, wide head, typical of breed and sex, strong bone, loose, pliable skin, thick coat of fine hair and plenty of size for age, is the type which pleases the breeder and the feeder and finally the judge.

The show or sale rings are not places for thin beef cattle. They demand as they properly should, that entries carry flesh, a thickly evenly distributed, firm, yet mellow, covering of it, which, when coupled with pliability of skin, thick glossy coat of hair, the ability to walk actively, and a generally healthy, robust appearance, denotes that much prized condition, termed "bloom." To obtain this and, at the same time, to prevent an over-done condition so often developed in older cattle, as indicated by the accumulation of "gobby" patches of fat about the tail head, and a "groggy," sluggish carriage, should be the aim of every exhibitor.

Fitting the calf should begin when it is only a few weeks old, or at most, only a few months old. Milk is one of the best feeds that can be used for its development and for the first three to six weeks of its life milk only is necessary.

The calf intended for show would be allowed about all the milk it will take until it is twelve months old, or even older in many instances. During the first six to eight weeks after birth there is no better plan than to let the calf run on pasture with its dam. At the end of this period it is best to keep the cow and her calf in separate pastures and to turn them together at the barn or feeding shed for nursing twice daily—morning and evening.

When the calf is from three to six weeks old it is well to start it to eating grain, even though it still runs with its dam. A handful of a mixture of equal parts by measure of cracked corn, whole oats and wheat bran, supplied morning and evening in a low box inaccessible to the cow makes an excellent ration for starting it. Rolled or ground barley, ground kafir, milo or feterita

may be substituted for the corn, if available and cheaper. The quantity of the ration should be increased gradually according to the calf's appetite. It is not likely that it will eat more than is good for it at this age. If desired, after the calf becomes accustomed to eating, whole corn instead of ground corn may be fed for a while, but even for the young calf it is best to grind or roll small hard grain, such as barley, milo and kafir.

When the calf has reached from three to four months old its ration of concentrates may consist of 45 percent oats, 30 percent ground corn, 15 percent wheat bran and 10 percent cotton seed meal, the proportion being by weight. This ration, which may be varied in the proportion of its constituents according to the object sought, is used quite generally and successfully, not only for calves but, also, for older cattle. It is especially valuable for growing and breeding animals because of its high content of muscle and bone building as well as fattening materials.

Linseed meal, though generally more expensive, can be substituted for cotton seed meal. Possessing about the same nutritive value as cotton seed meal, it is better as a regulator or conditioner in that it is slightly laxative and noticeably beneficial in effect on hide, hair and flesh or "handling quality." If used at all, linseed meal need not be substituted entirely for cotton seed meal, because, substitution to the extent of one-half will generally provide the desired conditioning effect, and cotton seed meal is almost invariably a cheaper source of protein.

Animals, of course, vary in their appetites and digestive capacities, some being able to consume more feed to advantage than others. As a general rule, cattle intended for show should be allowed about as much of the grain mixture as they will clean up readily twice daily.

Beginning 90 to 100 days previous to showing, when it is desirable to get a good finish on all entries, feeding three times daily should be practiced. About the same time, the ration may be advantageously changed to the proportion by weight of 45 percent ground corn, 30 percent oats, 15 percent wheat bran and 10 percent cotton seed meal, the change, of course, to be made gradually. This mixture is practically the same in proportion as one pound of cotton seed meal to nine pounds of ground corn, oats and wheat bran in equal parts by measure. Thus, by replacing some of the oats with corn, the fattening quality of the ration is improved.

In the case of older cattle that are more likely to have attained a sufficient degree of finish, no change in the ration may be necessary. The judgment of the feeder must decide. Smoothness and "bloom" will be maintained by moderate, steady gains rather than by heavy gains put on too quickly.

Should animals show lack of appetite at any time, a little black strap molasses, mixed with the other feed will often prove beneficial. Molasses is rich in fattening material, notably sugar, but practically entirely deficient in certain other nutrients. Therefore, it should not be used excessively for growing and breeding animals.

Cattle of all ages should be liberally provided with hay of good quality. If alfalfa hay is available, it may constitute one-third to one-half of the roughage to advantage. It is especially valuable for growing and breeding animals on account of its relatively high content of protein and lime, the latter so essential in the production of bone. Good grass hay, such as sorghum, prairie, and sudan grass, is better towards the finish, particularly for steers, as it is less likely than alfalfa to prove too laxative. If there be certain animals that are excessively paunchy, this condition may be overcome to some extent by limiting the allowance of hay or other roughage for a period of ten days or two weeks previous to showing, and also by supplying such animals very little or no water for a few hours just previous to showing them.

It is important that show cattle, as well as other cattle, have access to good pasture. It means cheaper gains, more exercise and better health. In hot weather, however, especially if the pasture is not provided with good shade, it is better to allow them grazing only at night and to confine them to a cool, well bedded barn or shed during the day, with as much protection from flies as possible. In the absence of permanent pasture, sudan grass will afford good grazing during the summer.

Salt should be supplied at regular and frequent intervals or a better plan is to keep it so the cattle may have free access to it. Some good feeders practice mixing a little salt with the feed. Good pure water is of great importance and should be accessible at all times or be supplied regularly, at least, twice daily and, preferably, three times during warm weather.

Exercise is very essential. It is not only necessary for the maintenance of good health and appetite, but it helps to keep animals smooth and in good form. As a rule, when cattle have access to pasture they get sufficient exer-

cise, but otherwise it is best to lead them, at least, a mile daily.

If one is to attain the greatest success in an effort to produce winners it must be realized that much depends, not only on the kind of cattle and the feed they receive, but on the feeder. Regularity in feeding and in the performance of other routine duties with the cattle should be strictly adhered to. Any change in quantity, especially, in the case of increases, and in kind of feed should be made gradually. If the cattle do not clean their feed boxes after a reasonable length of time, it is important that the remaining feed be moved and a smaller quantity of fresh feed supplied the next time. The feeder, who so feeds his cattle that they will eat liberally, "clean up" each time, and be ready with a good appetite for their next feed, is getting results. Only gentle, kind treatment should be practiced. Abuse and excitement should be avoided, absolutely. It is the well fed, quiet, contented animal that makes the best progress.

It is very important that every animal that is being fitted for show or sale be well halter broken, trained to lead and to stand squarely on its legs before being taken away from home. This training should begin when the calf is young at which age the least trouble will be involved.

Attention to the feet must be given. The hoofs, which particularly, in the case of older cattle, will often grow so long as, not only to detract from their appearance, but prevent them from standing correctly or getting about well, should be kept trimmed back and in proper shape. The last trimming before showing should be done four or five weeks ahead, so that should any tenderness develop, it will have time to pass away and thus prevent possible lameness at the time of the show.

All of the show herd should be given a good washing from time to time—as frequently as every week or ten days during the month or six weeks previous to and during the show season. On such occasions, an application of a solution of a coal tar dip used according to the directions of the manufacturers will put the skin and hair in nice condition and kill any lice or other parasites that might be present. Tar soap is good to use in the washing process. If possible, during the fall and winter, warm days should be selected for this job and it is best to use water of about blood temperature. After being washed, those animals with hair of sufficient length should have their coats fluffed, if they are to be thus exhibited. Care should be taken that no animal is allowed to

stand in a draft. If the weather demands it, each one should be blanketed until thoroughly dry. For a week or ten days before and during the show, each animal should receive daily grooming with the brush followed by a rub with a woolen cloth. This practice is especially desirable in the case of those animals that are to be exhibited with smooth coats. Whether an animal will show to better advantage with a fluffed or a smooth coat, is a matter for the exhibitor to decide.

In preparation for showing, it is quite a common practice to clip the tails of Shorthorns from just above the switch up to and including the long fringe of hair on the tail head, thus giving a neater, smoother appearance. This is generally done about a week before showing as a better appearance is presented, if there is a little time for the hair to grow out some. The long hair on the tail head should be trimmed whether the tail is clipped or not. In clipping the tail, care should be taken to begin high enough to leave the switch long.

The horns should be dressed smoothly and in a nice way to maintain the natural flat appearance. A rasp or half round file can be used in the dressing process to advantage, especially with the older cattle, and sand paper or steel wool will be found necessary in obtaining a smooth surface. Polishing the horns is next in order. Good metal polish or a mixture of oil and tripoli applied and rubbed in vigorously with a woolen cloth, followed by a thorough rubbing with soft paper such as newspaper, will give good results. It is best that this work be done while the cattle are still at home, though if the dressing be done there, the polishing can be done in a comparatively short time after reaching the show.

When the time comes for shipping, it is important to provide clean, well bedded, well ventilated cars and to load the cattle so that they will have plenty of room to lie down comfortably. The cattle should be watered frequently en route, and, if possible, sufficient water to last until arrival at the show should be carried along. At all times, care should be taken not to over-feed and this is especially important when cattle are on the road. On arrival the cattle should be unloaded as soon as possible, located in well bedded stalls and fed some hay. It is best not to water too heavily at first and the allowanec of concentrates should be lighter than usual for the first feed or two in order to avoid scours, or getting off feed. All animals should be washed previous to the day that showing is to begin, but, if arrival is made in sufficient time, it is

best to let cattle rest for a day before washing them. While at the show, the best time for exercising is early in the morning before feeding, when each animal should be led out for a walk.

Spaying Cows Adds to Milk, Tests Reveal

Condensed from The Western Farm Life

WRITING in the North American Veterinarian, Dr. Richard N. Shaw has presented a strong argument in favor of spaying milk cows, under certain conditions, for greater milk production.

Nature has provided a way for lactating cows to decrease in milk production as the calf grows and becomes less dependent on its mother's milk. A large part of this control resides in the ovaries. Without this control the cow would continue to produce the maximum in milk production long after the offspring has ceased to be dependent on its mother for sustenance. When a cow conceives her production begins to decline. The spaying of cows has never been practiced much in this country, and almost never for milk production.

After a careful observation, with checking on milk production and other factors, Dr. Shaw has made the following statement:

"We are firmly convinced that if spaying is confined to selected animals and done at the proper time, the results will be extremely gratifying to the owners." Best results are obtained when cows are at their prime—from 5 to 7 years old and between 60 and 90 days after freshening—which is approximately the time the cow would be bred.

When the ovaries are removed the veterinarian eliminates the control that acts as a brake on the milk-flow and the cow continues to produce her maximum production for a longer period of time—possibly for as long as 2 years as against 8 to 10 months for the unspayed cows.

Ten specific reasons are given in favor of a spaying program when properly supervised, the three most important being: (1) The bull can be replaced with a profitable cow; (2) It eliminates the cost and care of feeding a dry cow 2 or 3 months each year; (3) It eliminates the hazard of calving, such as retained placenta and milk fever. When the spayed cow has ceased to be a profitable producer she is sent to the block, and has put on weight faster and more economically than the unspayed cow.

Reprinted by permission from Western Farm Life, Denver, Colorado, July 15, 1945

Protein Hunger

Condensed from American Miller & Processor

Lamar Kishlar

Soybean Research Council

THE HIGH producing herds and flocks on the more efficient farms of America are the best fed in the world. It is, however, quite a different story for the average farm animal and fowl. There always has been "protein hunger" among the common flocks and herds in this country. Our nation can double the use of concentrates before the saturation point is reached. If all the birds and farm animals could be fed a well-balanced diet the efficiency of producing beef, pork, milk and eggs would be stepped up many fold.

It is generally agreed that for efficient production of meat, milk and eggs, high protein concentrates should be fed with carbohydrate feeds in the ratio of about 1 to 6.

On the basis of the prewar average years of 1937-41, the four principal feed grains, corn, oats, barley and grain sorghums totaled 85,100,000 tons fed. Other feed grains amounted to 4,500,000 tons while grain by-products will add another 8,500,000 tons. Thus, the quantity of all carbohydrate feeds fed averaged about 98,100,000 tons per year for the 1937-41 period.

At a ration of 1 to 6, it would require about 16,300,000 tons of high protein feeds (oil meal equivalent) to adequately balance the carbohydrate feed available for efficient livestock and poultry production. However, supplies of high protein concentrates for this period averaged only 7,700,000 tons (oil meal equivalent) which is 8,600,000 tons less than the optimum requirement, or, on an average, only one-half enough to do the best job. America has always been "protein-short," but it took a war to wake up the average feeder.

During the war years, soybean oil meal was called upon to carry the extra demands for protein caused by the emergency. It was most fortunate that the soybean had secured a firm position in the domestic economy before war clouds appeared and that its production had grown from a mere 5,000,000 bu. in 1924 to 107,000,000 bu. in 1941. Later crops run up to a 200,000,000-bu. figure.

Reprinted by permission from the American Miller & Processor, July, 1945

The estimated use for feed of animal proteins such as meat scrap, tankage, fish meal, and milk by-products, has remained almost constant for the past decade. The use trend of cottonseed meal also has remained nearly constant for the last ten years. Only soybean oil meal and linseed oil meal have shown tremendous gains in production and consumption. It was soybean oil meal which took up the shock and supplied the increased protein demands caused by a global war. The minor oil meals including linseed meal, peanut meal and copra meal about doubled in consumption but because of their relatively small volume added only moderately to the total tonnage of protein concentrates used.

American livestock and poultry never have been adequately fed and much grain has been wasted. When periods of emergency appear and more feeders practice better feeding, the shortage of proteins shows up and a scramble for the limited supplies occurs. We produce too little protein feed in proportion to carbohydrate for a balanced feeding program.

In the post-war world it is the soybean which must continue to make up the need for protein. The production of animal proteins is limited by the livestock slaughtered and these will diminish when wartime needs fall off. The production of fish proteins is limited by restrictions of weather and available fish. The amount of fish proteins has remained static for a decade. The available cottonseed meal is slowly diminishing as the production of cotton is curtailed. Peanut crushing and linseed crushing gained under the stimulation of war but in comparison with other protein concentrates their volumes do not greatly influence the total proteins available. It is the soybean which must carry the load of the peacetime protein demand. In our post-war period, more soybeans and less carbohydrate feeds will give us better feeding economy.

Not only is the soybean capable of filling the post-war need for protein but it is also qualified to help maintain the nutrient elements in our soil. The soybean, a legume, takes nitrogen from the air and deposits it in soil.

Because of the rapid advances being made by the agronomist, the soybean technologist, the soybean processor and the biological chemist of today, American agriculture tomorrow will be on a far more efficient and balanced basis which not only will conserve the soil but also will help produce better and less expensive meat, milk and eggs. In the post-war world, as in a world at war, it is the age-old soybean which will lead to a better way.

New Method Keeps Processed Cream Fresh, Tasty, for Year or Longer

Condensed from Westinghouse

TOMORROW's housewives and restaurateurs may keep processed or "sterilized" cream pure, fresh and tasty for a year or longer at ordinary room temperatures, thanks to a new method of processing and sterilizing such food products.

Now being used exclusively in the production of table cream and whipping cream for the armed forces overseas, the new method is the result of six years of research and development by the California Milk Products Company, Gustine, Calif.

It involves "flash sterilization," followed by bottling and hermetically sealing the product, known as "Avonset," under conditions as nearly 100 per cent sterile as modern food and electrical industry scientists can attain.

Exclusive of bottling, capping and labeling operations, processing of the product under the new method—not pasteurization but sterilizing — requires only four minutes from separation room to sterile holding tanks. Standard pasteurization — unsuitable for such a process because it does not kill all bacteria—requires approximately 30 minutes for the same cycle, he said.

Scientifically conditioned air in the bottling and capping room—one of the most critical steps in the process—is kept virtually free of dirt and bacteria electrically. This is accomplished by use of an electronic air cleaner—the Precipitron—developed by the Westinghouse Electric Corporation, and by invisible germ-killing ultraviolet rays produced by slender tubular Westinghouse Sterilamps.

Prior to processing, a small amount of vegetable "stabilizer" —one-fourth of one per cent or less by weight— is added to sweet fresh cream. Function of the stabilizer, one widely used in ice cream, is to keep the milk solids in the finished product from separating out on long storage.

The mixture is preheated and sterilized at temperatures varying between 260 and 280 degrees, Fahrenheit, then is cooled rapidly and is passed into sterile holding tanks. From the holding tanks, it is piped to bottling room as needed.

Airborne dirt particles or bacteria could contaminate the cream during bottling and capping, hence could nullify all the purity

Reprinted from "Westinghouse," 40 Wall Street, New York

precautions taken in earlier steps in the processing. For that reason, it is vital that air in the bottling room be as pure and clean as possible.

Air delivered to the bottling room is thoroughly washed, brought to the proper temperature and humidity, then passed through the Precipitron. In this electrical air cleaner, foreign particles as small as one-250,000th inch are given tiny charges of positive electricity and are immediately drawn from the air to negatively charged metal plates, and effectively imprisoned. Sterilamps in the air duct bombard the passing air—3,000 cubic feet per minute—with a steady barrage of ultraviolet rays, before it enters the room.

Before being filled, bottles are steam treated for 30 minutes at 275 degrees, Fahrenheit, hence are free of bacteria when removed from the retort in the bottling room, for use.

In the bottling room proper, Sterilamps are mounted on the ceiling, while others are located at strategic points along conveyors and around bottling and capping machines.

Workers in this room are examined daily for indications of respiratory diseases or infections, just before going on shift. If none is found, they don sterilized white gowns, gloves and masks, and enter the room through a Sterilamp-protected "air lock." After once entering, they must spend their entire four-hour shift inside.

Despite all these purity and cleanliness precautions, Avoset is held for six days after bottling and before shipping. During that time, Dr. Frank T. Donaldson, research director, runs myriad progressive tests on 120 bottles picked at random from each day's production.

In the "transportation test," some of the bottles are jiggled and bumped around a miniature "merry-go-round" for five days, then are examined for evidence that the stimulated churning action has begun to change the processed cream to butter. In another test, other bottles are kept at 100 degrees Fahrenheit for six days, to speed possibly damaging bacterial action. Fat globule and bacteria count tests are run daily. Failure to pass any of these tests satisfactorily results in rejection of the entire run from which the test bottles were taken.

Result of the entire process, now thoroughly tested and proved, is sterilized or stabilized cream which is more than 99 per cent pure cream and which will stay fresh and retain its original flavor and natural consistency for more than a year in the original containers and at ordinary room temperatures.

Marketing Your Purebred Livestock

Condensed from American Hampshire Herdsman

Lt. H. D. Elijah

FORTY-SIX to forty-nine percent of the consumer's meat dollar is expended in processing and marketing meat. This leaves between 51 and 54% of the meat dollar for the farmer. Thus the marketing of commercial livestock is a necessarily expensive and an important part of the livestock program.

The marketing of purebred livestock is even more important to successful purebred production than marketing is to commercial production. Yet, comparatively little attention has been given to setting up a general and complete purebred marketing system.

The selling of purebred animals as breeding stock represents a problem because no public purebred market places have been set up where purebred animals may be shipped to be sold on their merits as breeding stock, and no system of classes and grades has been set up for purebreds for determining and reporting their market value. Thus the producer of purebred livestock must be his own salesman. He must contact the prospective purchaser, and deal with him directly. Herein possibly lies one of the reasons why only a small percentage of the livestock in America is purebred. Many breeders are successful feeders and fitters, but are not salesmen.

In many instances they have not set up a complete purebred marketing program aimed at economically deriving the highest prices the quality of their livestock merits and can afford. However, much progress has been made in advertising since the earliest written advertisement was issued about 1000 B. C. It was prepared on papyrus, a writing material made from the pith of the papyrus plant. In it an Egyptian slave owner advertised for the return of a runaway slave. Even though we have made much progress in advertising, scientific distribution has not kept pace with scientific production.

A purebred breeder that considers his enterprize on a business-like basis would consider the following points:

What quality or grade of purebreds will be produced? Purebred livestock producers may be divided into three groups (a) Those with purebred herds where the main purpose is to produce mar-

Reprinted by permission from American Hampshire Herdsman, Peoria, Ill., July, 1945

ket animals (b) Those with excellent purebred herds that sell to small breeders and to farmers for commercial production and (c) Those with the top herds that sell their produce almost exclusively to other purebred breeders.

What is the purebred breeder's number one job and to whom will his production be sold? Every breeder might consider that "all the milk purebred meat animals give" is meat. They all end up on the block if they are to be of economic value. Most all meat animals are produced by farmers. Less than 5 percent of our livestock is purebred. *The livestock breeder's number one job is to see that every farmer uses a good purebred bull, boar, and ram every year on good purebred or good grade females.* Sell the farmer on purebreds and then see that he gets good ones. Castrate those males that are inferior, those that have been mistakingly called "farmer bulls," "farmer boars," and "farmer rams." Sell the farmer on purebreds by selling him good purebreds.

Three general procedures are usually followed in selling purebred animals: (a) Sale by mail order (b) Sale by direct barter and (c) Sale by auction. The whole marketing program is affected not only by the quality, but by the number of head to be sold.

When the breeder has decided how and to whom he should sell most of his off-spring he can then plan his advertising program. The following points should be considered:

a. The local papers. The local weekly papers will usually carry an interesting story of your herd, your new sire, or on animals that you have entered in a local or state show or sale. An ad sent to the ten nearest leading local rural papers before an auction should help get farmer support.

b. The state farm papers. The state farm papers reach hundreds of good farmers—prospective users of good sires. Help sell the farm on purebreds by advertising in the state farm papers. Send interesting stories to your state farm papers.

c. Market papers. Daily livestock papers published in livestock markets offer excellent mediums of advertising since their circulation goes mainly to livestock men.

d. Breed papers. Naturally the breed paper can and does do a lot of promoting of purebred livestock. However, many breeders do not budget their advertising costs throughout the year. Every breeder that has any reasonable number of purebred livestock for sale should consider using a 5″ ad in every issue of his breed paper. Then before sales he can

use as much additional advertising as the number and quality of his livestock merit.

e. Pictures and cuts. A good picture offers one of the best aides in selling livestock by mail order. Every good ad should contain a good cut. Good cuts have sold more livestock than bottles of printers ink.

f. Farm name or trade mark. A trade mark for your livestock such as "Production Bred," "Hytest," or "Production is Paramount" will help identify your herd and emphasize the desired point in the mind of the prospective purchaser. Roadside signs placed along well traveled highways will help locate and advertise your farm and herd.

g. A guarantee. A reputation for fair and honest dealing is one of the primary requisites for success in any business and of special importance in the purebred livestock business where so much depends upon the integrity of the producer. A properly worded and followed guarantee is good advertising.

h. Registration papers. Registration papers are a form of advertising and promotion of purebred livestock since they offer evidence that the animals came from pure breeding and consequently should be better breeders than non registered animals. All good purebreds sold for breeding stock should be properly recorded. The new breeder, the young breeder, and the absentee owner especially enjoy getting the registration papers promptly. They enhance the pride of ownership in the new breeder.

i. Hand bills and sale catalogues. Lists and descriptions of animals offered at private treaty or at auction are usually of value. A note plus a list or description of the offering sent to the vocational agriculture teachers, farm security supervisors, and county agents will help keep your herd in their mind.

j. Records of production. One of the best and soundest methods of advertising purebred livestock is through official production information. In hogs the number of pigs farrowed, weaned, and marketed, their weights at birth, lbs. gain are all of primary importance to commercial pork producers. These points offer one of the strongest reasons for using proven purebreds since their use more nearly assures profitable production than when untried purebreds or scrubs are used.

k. The livestock show. One of the most widely used, best and most popular methods of advertising purebred livestock has been the livestock show. However, false ideals and undue emphasis on minor considerations have at times been set up as impractical

standards. Thus farmers tried and quit the nonprofit producing purebreds that were show ring winners. The livestock show by definition is primarily a market place. Those animals that win should be the ideals for practical, efficient, and profitable livestock production. The war has removed many of our luxuries. One considered luxury was our fairs. Yet fairs are primarily a market place and a means of education—both essential in war time. Practical shows and sales were set up in many instances to replace the fair. May the practical classes and shows be continued after the war and help make fairs a real market place and advertising medium for purebred livestock! If practically set up and used, our fairs should never again be considered a luxury to be dispensed with in times of national stress.

l. Mailing lists. An up to date mailing list should be maintained and should contain names that have been carefully selected.

m. Sales letters. The letter written in answer to an inquiry is a sales letter. It should be friendly and convincing. Most breeders can well afford to answer their correspondence immediately, and explain in simple, direct, and frank statements what they have for sale. Simple but attractive letterheads usually create a feeling of responsibility in the mind of the would-be purchaser toward the producer.

n. Consignment sales. Since no public market place has been set up where purebreds are sold on their merits as breeding animals, the consignment auction has been the nearest approach to a public market place and the sale reports of such auctions have been the market report for purebred animals. The number of consignment sales has grown during the war because consignment sales offered the purchaser an opportunity to view many animals of different breeding at one location and to buy at his price the quality and grade desired.

The consumer pays for the production and distribution of goods including the selling expenses and cost of advertising. However, when a product is advertised it may sell in a much larger volume than it would if it were not advertised. As a result the price of this product may be less for each unit than that of a similar product not advertised. Advertising costs money but if wisely used, it reduces other expenses due to greater efficiency coming from increased volume.

Advertising benefits both the buyer and seller—the buyer in smaller costs; the seller in a greater volume of sales. The more a sound product is efficiently and truthfully advertised, the more it

is consumed; the greater the quantity consumed, the greater the quantity produced; the lower the cost of production per unit. Thus well planned efficient advertising of a sound product may actually reduce the selling price.

The good purebred animal has a certain economic earning power. If he is sold on the market for meat because of lack of a breeder market his full economic value has not been received. If too much money is spent for advertising, the purebred animal will not be a sound economic investment. How much money should be spent in advertising breeding animals that are worth $100, $250, and $500? Producers of staple products frequently spend from 2 to 5% of the sale receipts for advertising. Producers of new and special products spend 15 to 30% of sales receipts for advertising. Selling costs are approximately 16 to 20% of the selling price of hybrid seed corn.

Since purebred livestock is somewhat of a special product, because of the great increase in returns it makes as compared to scrub livestock, it seems reasonable to assume that 10% would be an adequate yet necessary amount to spend for advertising and marketing of purebred livestock. Thus $10, $25 and $50 could be spent for selling the $100, $250 and $500 animal. If a sale of 40 head of $100 animals is held the sale expenses could be $400. The sale expenses for selling 1,000 head of $100 animals could be $10,000. Thus the advantage in volume is apparent.

The volume producer can advertise more, sell for less, and receive greater profits assuming other production costs are equal. Many livestock sales are held that do not gross more than $5,000. On a basis of 10% for selling, the sale expenses should not exceed $500. It is necessary to spend approximately $500 to conduct a satisfactory sale. In addition to disposing of animals catalogued to sell, the sale will help market many other animals produced later. Consignment and combination sales can and do play a definite part in providing the advantages of volume to small producers.

Purebred livestock breeders will succeed as long as they economically produce good purebreds and get them sold to farmers at prices profitable to the breeder and purchaser. A well planned complete marketing program should increase the demand for purebred livestock, and make more profit for the producer and a reduced purchase price for the buyer.

Some Nineteenth Century Corn History

Condensed from The Fertilizer Review

The following is from an editorial in *The Southern Planter* for June, 1945:

After running around in circles for 50 years, following first one fad and then another in corn growing, the South is coming back to the methods of Capt. Zachariah Jordan Drake, of Marlboro County, South Carolina, who in 1889 produced 255 bushels of shelled corn on an acre of land, according to his own account. The champion corn grower in the Middle West last year averaged 182 bushels per acre; a North Carolina farmer averaged 107 bushels per acre; the National average was 33.2 bushels per acre, and for many states far below that.

Captain Drake, before the days of scientific farming, hit upon the fundamentals of successful corn growing—plenty of organic matter and plant food in the soil with liberal side-dressings of nitrate of soda, cottonseed meal and kainit; a well adapted variety, planted "in the furrow"; and the plants thinned to "one stalk every 5 or 6 inches." He manured the acre heavily in February and plowed under "500 pounds each of manipulated guano, cottonseed meal and kainit." He plowed deeply, harrowed thoroughly and incorporated cottonseed in the soil. Some acid phosphate and bone meal were used before planting. Then, as the rot system began to develop, heavy side-dressings of nitrogenous plant food began.

Strangely enough our experiment stations this year are urging (1) plenty of organic matter in the soil, preferably manure, (2) a complete fertilizer before planting, (3) plenty of plants per acre, 6,000 to 10,000 stalks depending upon fertility (16 inches apart in 3½-foot rows would be 9,350 stalks) and (4) heavy applications of quickly available nitrogenous fertilizers, when corn is knee high—precisely the same program followed by Captain Drake to set a record in corn production 56 years ago.

Reprinted from The Fertilizer Review, Washington, D. C.

Orchard and Garden Mulches

Condensed from The Rural New-Yorker

Clarence E. Baker

MULCHING is as old as plant life itself. It is being constantly demonstrated by the natural mulch or leaf mold that accumulates in all our forests. It is now a standard cultural practice for growing many crops, yet there are still many instances in both fruit and vegetable culture where mulching could be employed to much greater advantage than at present.

When one thinks of a mulch, he probably pictures a strawberry patch with evenly spaced rows of plants and large, luscious, red berries reposing upon a bed of straw. One of the functions of the straw is to keep the berries clean by preventing their contact with the soil. It also contributes in many other ways to the production of those attractive berries. If the ground about the plants had not been covered with a mulch, it is likely that many of the plants would have been heaved from the ground during the Winter by the alternate freezing and thawing of the soil. If the weather becomes unseasonably dry before the berries mature, the mulch retards the loss of moisture from the soil. It is true that strawberries can be grown without this mulch of straw, but those who have tried this method are likely to be the first to agree that the results are disappointing.

If this straw mulch is so important in strawberry culture, why is it not of value in growing other plants? The answer is that, when properly used, mulching is just as important in growing many crops as it is for strawberries. Commercial apple growers in many sections of the country recognize the value of mulching their trees, and hundreds of acres are now grown under various types of mulches. To a lesser extent, stone fruit trees are mulched in commercial orchards. Raspberry and blackberry plantations frequently are mulched and very productive patches have resulted. Potatoes and tomatoes have also been grown to better advantage under a straw mulch as have various other garden vegetables.

Reprinted from The Rural New-Yorker, New York City

What Is Mulch?

The term mulch refers to any material spread over the surface of the soil about growing trees or plants to take the place of cultivation. A mulch should be sufficiently heavy to prevent completely the growth of grass or weeds. Many different materials may be used as mulches. One reason that mulching has not been used more by commercial fruit and vegetable growers is that enormous quantities of material are needed to provide and properly maintain mulches over large acreages. This is not such a serious problem in the home orchard, small fruit planting or vegetable garden, as sufficient material usually can be easily obtained. When crops are grown under irrigation or on deep, loose soils into which water penetrates readily, and in which tree roots grow to depths of six feet or more, then mulches are not so important. But when trees or other deep rooted crops are planted on tight clays or shallow soils, mulch culture becomes very important.

Advantages of Mulching

On most types of soils of average fertility, mulching has many advantages over cultivation, especially in the home orchard. Too frequently, where tree or bush fruits are grown, they are not cultivated at all, or so infrequently that they make a poor response. Under such conditions, mulching pays big dividends. Devitalized fruit trees, if free from serious insects and diseases, frequently can be brought to a vigorous and productive condition in a very few seasons if adequately mulched with strawy manure, or with straw to which a liberal application of a nitrogen fertilizer has been applied. The initial mulch should be eight to twelve inches thick and should cover the soil from one foot from the trunk of the tree to a distance about two feet beyond the spread of the branches. This mulch should be replenished each Spring or Fall to make up for settling resulting from the compacting and decomposition of the original mulch. The remainder of the area between the trees may be left in sod.

Small fruits and the bramble kind generally are mulched by covering the entire soil area with a layer of similar thickness. In commercial small fruit plantings, every other middle or occasional middles are cultivated to reduce the fire hazard in dry periods. In the case of potatoes, tomatoes and other vegetables, the entire soil area usually is mulched after the plants are established.

Once the area is mulched, cultivation is eliminated and weeds are also controlled. Most of us are often inclined to let the cultivator rest at the very time we

should be pushing it most vigorously. Mulches never rest, but are on the job when most needed.

Use Fertilizer Also

Spring is the best time to mulch trees and bush fruits. At this time of year the ground is moist and mulching helps to retain the favorable condition. Vegetable crops, such as potatoes, beans and all root crops, should bemulched as soon as the plants are high enough that they will not be smothered by the material used. Tomatoes can be mulched within a few days after being transplanted.

When any mulch such as straw or other vegettative material that is low in nitrogen is applied, a nitrogen fertilizer also should be used in liberal amounts. Nitrate of soda, sulphate of ammonia, ammonium nitrate, or a nitrogen carrier sold under any of the various trade names is satisfactory. Unless this is done, most of the available nitrogen in the soil may be utilized by the bacteria that decompose the mulching material and a temporary nitrogen shortage is likely to result. A nitrogen deficiency brought about in this manner probably is the greatest cause of unfavorable results occasionally reported following mulching. If manure is used in the mulch, there usually is little need for the nitrogen fertilizer, as sufficient nitrogen is readily available from the manure. For this reason, strawy manure or a mixture of straw and barnyard manure makes a very desirable mulch. Hardwood sawdust is quite widely used as a mulch. Sawdust contains very little nitrogen, so a liberal application of a nitrogen fertilizer should accompany its use. Equal parts of sawdust and barnyard makes an excellent mulch, and with this mixture a nitrogen fertilizer seldom is necessary. Sawdust from walnut and some coniferous trees are sometimes harmful, due to possible plant absorption of soluble toxic materials. It is therefore safer not to use such sawdust.

A nitrogen shortage following mulching is temporary. After two or three seasons the decaying organic matter of the mulch that becomes incorporated with the soil actually increases the amount of nitrogen that is available to the mulched trees or plants. After the third season, it seldom is necessary to add a nitrogen fertilizer, even when the mulch is replenished. Mulches function in several ways to bring about conditions in the soil that are favorable for plant growth. They improve the moisture relations very effectively. Then encourage the penetration of rainfall into the soil, both by reducing the surface run-off and by improving the soil structure so that water is ab-

sorbed more readily. Condensation of moisture from the air has been shown to take place beneath a mulch, thus increasing the soil supply. Evaporation of moisture from the surface of the soil during hot, dry periods is effectively retarded; and serious moisture losses from deep in the soil is also prevented.

The greater resistance of mulched soil to drying out during extended hot, dry periods, appears to provide a condition within the soil that causes plant nutrients to remain more continuously available than in soils subject to alternate moist and dry conditions. As the mulch decays, valuable organic matter and nutrients are added to the soil.

Kinds of Mulch

Mulching materials may be either organic or inorganic in nature. The most common organic mulches are straw, hay, sawdust, marsh grass, meadow grass and shredded corn fodder. Various other materials such as pea vines from canning factories, pressed sorghum cane, various native weeds and grasses, seaweed, shredded waste paper and a host of others are locally available in certain areas. Leaves do not make a good mulch for either strawberries or vegetables, as they pack too tightly together when wet. If it is desired to make use of fallen leaves, they may be mixed with straw and used on tree or bush fruits; otherwise, their place is in the compost pile.

Many inorganic materials are used for more permanent mulches, such as cinders, mineslack, shale and glass-wool. While these add no nutrient or organic matter to the soil, they have many of the advantages of organic materials, and are not so likely to cause shortages of soil nitrogen. Their use is limited largely to fruit trees and bush fruits, and they do not share the general popularity of vegetative materials. The use of inorganic materials, especially slack and cinders, on ground that is to be occupied for only a short time is not recommended, because they might be detrimental to any later planted crops.

Organic Matter—Cash for Your Soil Bank

Condensed from Successful Farming

H. R. Smalley

National Fertilizer Association

In a broad sense, all plants and animals consist very largely of organic compounds, being made up of carbon, hydrogen, oxygen, nitrogen, carbohydrates, and proteins—as distinguished from inorganic compounds such as rocks and chemical salts.

Because this article will deal with the soil, we are, of course, not interested in those organic materials that are a part of the soil or are used in soil improvement.

Another term with which you are familiar in this connection is "humus," which may or may not mean the same as the term "organic matter." Crop residues, such as straw, cornstalks, roots, and stubble, are organic matter, but not humus. When these materials decay in the soil until you can no longer identify them, then they become humus. Animal manures, for example, are largely organic matter but not humus, altho they become humus quickly when applied to the land.

The organic matter in many of our soils has gone down as a result of cultivating and cropping, and if we are to hold yields or increase them it will be necessary to set up a cropping program that will add more organic material than we have been adding up to this time.

Originally most of our soils contained a good supply of organic matter in the surface layer. Under forest conditions, where there are no deep-rooted grasses, the topsoil is usually rather thin and because of the high rainfall in forest areas the available plant food will leach downward. Under prairie conditions, however, the grass roots penetrates the soil to a depth of several feet and, in decaying, form a thick layer of topsoil. Also, there is usually less rainfall in prairie than in forested regions, and consequently less leaching. In general then, our prairie soils are more fertile than our forest soils.

When the forests were cleared away and the land plowed and cultivated, and when the prairie sod was broken up, there was rapid loss of organic matter, for the more it is exposed to the oxygen of the air, the more rapidly

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it decays, just as stirring a fire makes it burn faster.

Organic matter does several very useful jobs. Scientists say that it gives the soil a good structure, which simply means that it makes the soil easier to cultivate, makes it loose and crumbly so water and air can move freely. It makes a heavy soil lighter, but it also makes a light, sandy soil appear to be heavier. It makes all soils absorb water faster, thus preventing runoff and erosion, and it also increases the capacity to hold water. Organic matter itself absorbs and holds water, thus increasing the total supply of usable soil water.

Organic matter in the soil feeds the bacteria and other soil life which are such essential factors in fertility. It provides the energy necessary for their growth and in growing they take up nitrogen, phosphorus, potassium, calcium, and other plant foods, making these elements more available to crops, at the same time preventing their loss from the soil.

But perhaps of greatest importance is the fact that practically all of the nitrogen supply in the soil is in combination with the organic matter, with the exception of a relatively small portion which is present in the form of ammonia and nitrates. As organic matter decays, nitrogen is released and made available to crops; and the rate at which the nitrogen becomes available depends upon how the soil is handled

The net result of constant cultivation without putting back enough organic matter and constant removal of crops without putting back enough plant food was that much of our cropland became poorer and poorer. Even our pastures have declined in fertility due to removal (in the bodies of animals) of nitrogen, phosphates, potash, lime, and other properties.

When a soil loses a large part of its original supply of organic matter and most of its available plant food, it becomes a fit subject for erosion. Altho Nature always tries to hide her nakedness by growing vegetation, even weeds cannot make much growth on an exhausted soil.

Some organic matter is added to the soil each year in the regular course of farm operations even by the weeds that grow in fields after the crops are harvested. Every crop leaves roots in the ground and stubble or other parts of plants that can be plowed under. No material of this kind should be wasted.

The total quantity of crop residues that can be used in maintaining the soil supply of organic matter is of course dependent on the fertility of the soil or on the plant food that is used to produce the crops on any particu-

lar farm. For example, in a West Virginia experiment, crops were grown in a general rotation for 15 years. On the unfertilized land, 20 tons of crops were produced during the period, compared with 59 tons produced on the fertilized land. At the end of the experiment, the unfertilized soil contained 21 tons of organic matter an acre to plow depth, while the fertilized soil contained 30 tons.

I have regretted the burning of straw and cornstalks and stated that such materials should be plowed under or worked into the soil. However, farmers have sometimes obtained poor results from this practice as compared with results obtained on burned-over land. For a long time the reason for this was not clear, but it is now known that when straw or cornstalks or similar material decays the bacteria actually use soil nitrogen and the crop growing on the land is frequently starved for nitrogen. One solution to the problem is to apply a nitrogen fertilizer or a mixed fertilizer high in nitrogen, broadcast before the crop residues are plowed under. The nitrogen thus added feeds the bacteria and hastens decay, and it also supplies nitrogen for the crop.

The legumes are much higher in nitrogen than straw and cornstalks, and for this reason they do not tie up soil nitrogen when they are plowed under. And this reminds me of a wheat demonstration conducted in Illinois two or three years ago which shows the combined effect of legumes and fertilizer: The unfertilized yield was only seven bushels per acre, and with commercial fertilizer alone it was 15 bushels. But when a crop of soybeans was plowed under and the same fertilizer applied, the yield rose to 39 bushels. The soybeans added a lot of high-nitrogen organic material.

It scarcely seems necessary to emphasize savings and use of farm manure. Manure furnishes both plant food and organic matter. Even so, there is a tremendous loss thru careless handling of manure and in some cases thru failure to make use of it at all. I shall not dwell on this except to add that manure contains about twice as much nitrogen and twice as much potash as its available phosphate content, and for this reason it pays well to add superphosphate to it. This may be done by adding superphosphate to the manure as it is made in the stable at the rate of 1 to 1½ pounds per animal (cow, steer, or horse) per day, or by scattering 50 to 75 pounds of superphosphate on each load of manure, or by using superphosphate on the cropland to which manure is applied.

I have mentioned the value of

plowing under legume crops to add both organic matter and nitrogen to the soil, and I would like to emphasize this point. But I would like to say also that when these crops are plowed under they add nitrogen and organic matter only in proportion to their root and top growth. They will neither fix much nitrogen nor add much organic matter if they are starved for plant food; and when they are cut for hay or for seed they add little if any nitrogen but still furnish worthwhile quantities of organic matter.

I should also say a word about the non-legume, green manure, and cover crops such as rye, rye grass, sorghum, and millet. These crops produce large quantities of organic matter of low-nitrogen content and are useful to many growers (especially to truck growers and market gardeners), many of whom have adopted the practice of applying and plowing under commercial nitrogen with these crops.

Organic matter can also be supplied to the soil by having long-rotation pastures, that is, by keeping part of the land in good pasture for several years, then plowing it under for the production of cultivated crops. By fertilizing pastures, both the top and root growth are increased—the top growth to be harvested by animals, the roots to die and decay in the soil.

Wool-Blind Sheep Don't Pay

There was a time when range sheepmen were so anxious to increase fleece weight that they didn't care where ewes produced more wool—even on the face.

Anyone who still feels this way should check research work on the U. S. Sheep Experiment Station at DuBois, Idaho. There open-faced ewes of the same breeding and kept under the same conditions, produced about nine pounds more lamb per year, and just as much wool as "wool-blind" ewes.

The wool-blind sheep are handicapped on the range, they trail the band, take the trampled leftover forage, and have trouble finding water. Wool on the face apparently doesn't pay.

—*Farm Journal*

More Calves—Fewer Bulls

Condensed from Successful Farming

A general practice in commercial beef herds is to run three or four bulls per 100 head of cows during the breeding season. Since the income from such a herd depends on the number of calves available at marketing time, and since one of the big items of operating expense is the investment in bulls—$250 per head and upwards for good ones—any system which will increase production and at the same time cut production costs is worthy of note.

Bernard Briggs, of Antioch, Nebraska, has for several years followed the practice of dividing his commercial Angus herd into breeding units of 40 to 55 head and running one bull with the herd. Usually operating with four such pasture units, he changes his four bulls every week. Under this system he has practically cut his bull investment in half and has materially increased his calf crop percentage. In 1944 all but two of his 220 commercial cows were with calf. In other years he has had calving percentages of 101 and 103 percent, due to the large numbers of twins born.

Much the same report—larger calf crops from fewer bulls—is made by the range livestock experiment station at Miles City, Montana. Single bull units resulted in an average of seven more calves per 100 cows at a saving of an investment of two bulls per 100 cows. Figuring a better sort of range bull worth $250 and weaning feeder calves at $40 per head, a cattleman would be ahead $780 annually on each 100-cow unit.

The Montana range cow breeding experiment also indicates that much of the low calving percentages oftentimes attributed to "hard winters," poor grazing, or low fertility is due instead to the tendency of bulls and cows to congregate in separate groups on rough, well-watered ranges. If a vigilant rider is available to keep the bulls together, the calf crop percentage is improved; or, the rancher can split his herd into smaller units and rotate his bulls. While this latter system may call for extra fencing, the Montana experimenters point out that considerable fence can be built with part of the $780 per year saving.—C. K., Ill.

FOR THE FARMER'S LIBRARY

These books are recommended as outstanding in their field:

An Agricultural Testament—By Sir Albert Howard, C.I.E., M.A., former Director, Institute of Plant Industry, Indore. Oxford University Press. $3.50.

Animal Sanitation and Disease Control—By Dr. R. R. Dykstra, Dean of the School of Veterinary Medicine, Kansas State College. The Interstate Printers and Publishers. $2.85.

Beef Cattle — By Roscoe R. Snapp, Asso. Prof. Animal Husbandry, Univ. of Illinois. John Wiley & Sons, Inc. $4.00.

Beef Cattle Production in the South—By D. W. Williams, Head, Department of Animal Husbandry, A. & M. College of Texas, College Station, Texas. The Interstate Printers & Publishers (1941). $2.00.

Breeds of Livestock in America—By Henry W. Vaughan, formerly Prof. of Animal Husbandry, Iowa State Coll., Univ. of Minn., Mont. State Univ. College Book Company. $3.75.

Dairy Cattle Feeding and Management—3rd Edition—By H. O. Henderson, Prof. of Dairy Husbandry, W. Va. Univ., Carl W. Larson and Fred S. Putney. John Wiley & Sons, Inc. $4.00

Dairy Science — By W. E. Petersen, Ph.D., Assoc. Prof. and Assoc. Dairy Husbandryman, Univ. of Minn. Edited by R. W. Gregory. J. B. Lippincott Company. $4.00.

Diseases and Parasites of Poultry — By Edgar Hugh Barger, D.V.M., Berkeley, Calif., and L. E. Card, Ph.D., Prof. of Poultry Husbandry, Univ. of Illinois. Lea & Febiger. 3rd Edition (1943). $3.75.

Feeds and Feeding—By F. B. Morrison, Prof. of Animal Husbandry and Animal Nutrition, Cornell Univ. Morrison Press. $5.00.

Farm Management—By Robert R. Hudelson. The Macmillan Co. $2.00.

Farm Management and Marketing — By V. B. Hart, M. C. Bond, L. C. Cunningham, all of N. Y. State College of Agriculture, Cornell University. Publishers: John Wiley & Sons, Inc. $2.75.

Judging Dairy Cattle—By Edwin S. Harrison, Professor of Animal Husbandry, Cornell University. John Wiley and Sons, Inc. $2.75.

Livestock Production—By Walter H. Peters, Chief of the Division of Animal and Poultry Husbandry, Univ. of Minn. McGraw-Hill Book Co., Inc. $3.50.

Poultry—By A. R. Winter, Asst. Prof. Poultry Husbandry, Ohio State Univ., and E. M. Funk, Asst. Prof. Poultry Husbandry, Mo. State Univ. J. B. Lippincott Co. $5.00.

Profitable Poultry Keeping — By H. Clyde Knandel, Prof. and Head, Dept. of Poultry Husb., Penn State College. Orange Judd Publishing Co., Inc. $3.00.

Pork Production—By William W. Smith, Prof. of Animal Husbandry, Purdue Univ. The Macmillan Co. $3.75.

Roots in the Earth—The Small Farmer Looks Ahead — By P. Alston Waring and Walter Magnes Teller. Harper & Bros. $2.50.

Successful Poultry Management—By Morley A. Jull, Professor and Head of Poultry Dept., Univ. of Maryland. McGraw-Hill Book Co., Inc. $3.00.

Sheep Production—By Levi Jackson Horlacher, B.S.A., M.A., Asst. to Dean, Col. Ag. Univ. Ky. McGraw-Hill Book Co., Inc. $4.00.

Soil Conservation — By Hugh Hammond Bennett, Chief, Soil Conservation Service, U. S. Dept. of Agric. McGraw-Hill Book Co., Inc. $6.00.

The Farm Primer—By Walter Magnes Teller, formerly with the Farm Security Administration, U. S. D. A. David McKay Co. $2.50.

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BOOK NOTES

Farmers of the World — The Development of Agricultural Extension. Edited by Edmund deS. Brunner, Irwin T. Sanders, and Douglas Ensminger.

The primary aim of this book is to discuss the most effective general approach which a government can use in helping rural people solve their everyday problems. With war-torn countries ready to begin rehabilitation of their rural areas, **Farmers of the World** is particularly important, mobilizing the findings of science in this field and showing the way to present them to farm people with sympathetic interpretation and assistance in its application.

Each of the sixteen authors is either a national of one of the countries considered or an American with long experience in the area he discusses.

Each author describes the agriculture and life of the area he discusses, the types of extension service, and the implications in the socio-economic situation for programs of extension.

Publishers: Columbia University Press Pages: 208 $2.50

Seaman A. Knapp—Schoolmaster of American Agriculture, by Joseph C. Bailey, Department of History and Social Science, Hunter College.

The story of the man who put science in the farmer's fields along with the new-fangled machines of the agricultural revolution, and bridges the gap between the rural folk and the findings of the laboratory. Seaman Knapp's long life spans the transition in American agriculture from the vanished days of homespun self-sufficiency to the specialized, commercial, and mechanized age of international markets in full swing at the beginning of World War I.

Typical of America's age of enterprise, Seaman Asahel Knapp was an early fine stock breeder, agricultural journalist, president of Ames College, author of the first draft of the Hatch Experiment Station Act. He became one of America's first official plant explorers, a principal campaigner against the invading Mexican boll weevil, founder of the county farm and home demonstration system, nationalized into the Extension Service of the United States in 1914.

Publishers: Columbia University Press Pages: 304 $3.25

Palestine, Land of Promise—By Walter Clay Lowdermilk, soil conservationist, forestry engineer, assistant chief of the Soil Conservation Service.

Dr. Lowdermilk, following a survey of the Near East, has come to the conclusion that Palestine, by the unique combination of the natural features and resources of the Jordan Valley, makes possible a huge reclamation project capable of supporting at least four million refugees in addition to its present population of two million. He proposes the establishment of a Jordan Valley Authority, based on the T. V. A. of this country, and notes the present achievements of Jewish settlers in Palestine, the amazing changes they have wrought in that eroded, sterile land by irrigation, drainage, fertilization, reforestation, and other modern methods.

Publishers: Harper & Brothers Pages: 236 $2.50

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